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**CQ-DATV magazine - ISSN 2059-2191**

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## **Solar Power project**

### **Mid Cornwall Beacon and Repeater Group**

Our Group consists of a small number of retired technicians and engineers who help other organisations like "Cornwall Search and Rescue", "St.Austell Air Training Corps" and the local Amateur Radio Community and their Emergency Network to achieve more reliable radio communications throughout Cornwall.



We do not receive any kind of funding and have to raise the money for the electricity to run it all. Electricity is now costing more than we raise in donations.

Our project is to install a solar panel system at our site to offset the cost of electricity and be able to continue to provide our radio services to other community groups, even during power cuts and other emergencies.

We have the engineering knowledge and skills to make everything work, but we need the basic funding for the solar panels, which has been estimated at £4,800.

We would provide the labour for the project and integrate it with all the current repeater systems on our site.

We estimate that if the funding requested was received, the Solar Power project would be completed within six months and make a significant difference to our continued support of other community groups and the good work they do.

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## **HAM RADIO IN SPACE: AMATEUR VIDEO NOW TRANSMITTING FROM ISS**

As of Friday May 1st the Ham Video transmitter on board the Columbus module of the International Space Station is powered on and is transmitting in its Blank Transmission or BT mode. In this mode the transmitter is operated without camera but the digital TV signal is fully formatted. From a technical perspective, the BT signal is all that is needed for testing and fine tuning ground stations.

To that end, a European network of chained ground stations is nearly complete. Six stations span the continent in "X" formation. For each ascending and descending pass over Europe, four of these stations provide about ten minutes of solid copy. The chained ground stations are streaming to the British Amateur Television Club server which has set up a multi viewer page at [www dot batc dot tv](http://www.dot.batc.tv). This web page shows all six streams with each view having the ability to be maximized to full screen.

This operational mode is dubbed ARISS Ham TV. The video transmitter will stay on as long as orbit operations permit. When the ground stations are operating reliably, the transmitter will be used to enhance ARISS school contacts.

Uplink for audio will remain VHF only. More information is available at [www.ariss-eu.org/columbus.htm](http://www.ariss-eu.org/columbus.htm) (ON4WF)

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### NASA's New Horizons Detects Surface Features, Possible Polar Cap on Pluto



Pluto and its moon Charon, as imaged by New Horizons LORRI camera



This image of Pluto and its largest moon, Charon, was taken by the Long Range Reconnaissance Imager (LORRI) on NASA's New Horizons spacecraft on April 15, 2015. The image is part of several taken between April 12-18, as the spacecraft's distance from Pluto decreased from about 69 million miles (111 million kilometers) to 64 million miles (104 million kilometers).

**Credits: NASA/JHU-APL/SwRI**

For the first time, images from NASA's New Horizons spacecraft are revealing bright and dark regions on the surface of faraway Pluto - the primary target of the New Horizons close flyby in mid-July.

The images were captured in early to mid-April from within 70 million miles (113 million kilometers), using the telescopic Long-Range Reconnaissance Imager (LORRI) camera on New Horizons. A technique called image deconvolution sharpens the raw, unprocessed images beamed back to Earth. New Horizons scientists interpreted the data to reveal the dwarf planet has broad surface markings - some bright, some dark - including a bright area at one pole that may be a polar cap.

"As we approach the Pluto system we are starting to see intriguing features such as a bright region near Pluto's visible pole, starting the great scientific adventure to understand this enigmatic celestial object," says John Grunsfeld, associate administrator for NASA's Science Mission Directorate in Washington. "As we get closer, the excitement is building in our quest to unravel the mysteries of Pluto using data from New Horizons."

Also captured in the images is Pluto's largest moon, Charon, rotating in its 6.4-day long orbit. The exposure times used to create this image set - a tenth of a second - were too short for the camera to detect Pluto's four much smaller and fainter moons.



Since it was discovered in 1930, Pluto has remained an enigma. It orbits our sun more than 3 billion miles (about 5 billion kilometers) from Earth, and researchers have struggled to discern any details about its surface. These latest New Horizons images allow the mission science team to detect clear differences in brightness across Pluto's surface as it rotates.

"After traveling more than nine years through space, it's stunning to see Pluto, literally a dot of light as seen from Earth, becoming a real place right before our eyes," said Alan Stern, New Horizons principal investigator at Southwest Research Institute in Boulder, Colorado. "These incredible images are the first in which we can begin to see detail on Pluto, and they are already showing us that Pluto has a complex surface."

The images the spacecraft returns will dramatically improve as New Horizons speeds closer to its July rendezvous with Pluto.

"We can only imagine what surprises will be revealed when New Horizons passes approximately 7,800 miles (12,500 kilometers) above Pluto's surface this summer," said Hal Weaver, the mission's project scientist at the Johns Hopkins University Applied Physics Laboratory (APL) in Laurel, Maryland.

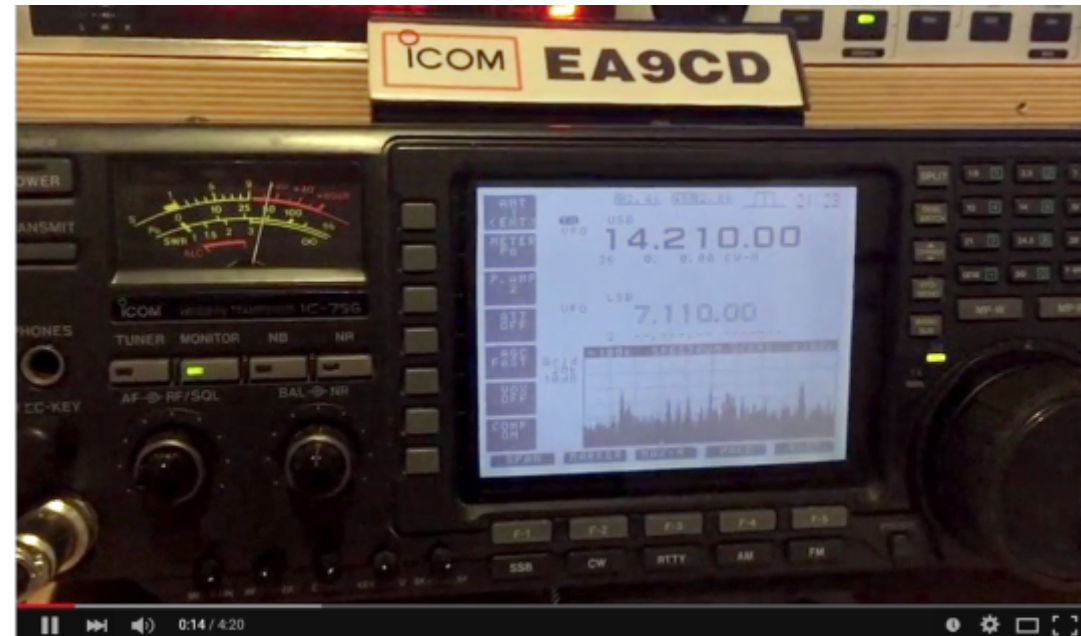
APL designed, built, and operates the New Horizons spacecraft, and manages the mission for NASA's Science Mission Directorate. SwRI leads the science team, payload operations and encounter science planning.

New Horizons is part of the New Frontiers Program managed by NASA's Marshall Space Flight Center in Huntsville, Alabama.

To view images from New Horizons and learn more about the mission, visit:

<http://www.nasa.gov/newhorizons>

## RESCUE RADIO: AMATEUR RADIO ON THE FRONT LINE AFTER NEPAL EARTHQUAKE



9N1EMERGENCY (Nepal) NET EMERGENCY IN 14210.0 by 4X6TT Amir.

Ham radio became a first responder after a magnitude 7 point 8 earthquake hit the nation of Nepal on Saturday, April 25th.

As this report is being prepared, at least 5000 are known dead and many others still missing. The quake also triggered avalanches on Mt Everest with several climbers killed.

Bill Pasternak, WA6ITF, is in the newsroom with the latest:

*"I don't know how this happened but we got a call from someone in the UK who was informed of what we are doing and informed the British government and they were very excited to hear what we are doing and they are monitoring both frequencies. They are monitoring this frequency and 14.205 to get the latest updates that they can get from us."*

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### X-Wing 434 MHz balloon on BBC Click

On Sunday, May 17 the BBC TV show Click broadcast a report on Essex Star Wars enthusiasts who flew an X-Wing in near-space



**X-Wing in Space - Credit Essex Space Agency**

The balloon carrying the X-Wing model was launched from Cambridge on April 21 and reached an altitude of 36,190m before bursting and returning to Earth, landing in a field between Bedford and Northampton.

Telemetry and Slow Scan Digital Video (SSDV) were transmitted on 434.510 MHz.

Phil St Pier of Romford and Matt Kingsnorth of Brentwood took around six months to complete the project at a cost of about £1,200.

Watch the BBC report with video shot at the "Essex Space Agency" Brentwood branch at <http://www.bbc.co.uk/news/technology-32384570>

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### International ATV Contest and Activity Weekend - 13/14 June 2015

Following on from the success of last year's SummerFun contest with 12 UK entries, the IARU Region 1 International Contest has been moved to June each year to capitalise on the good weather.

#### International ATV Contest 13/14 June 2014

- All bands up to 24 GHz
- Digital and analogue modes
- BATC awards for best Dx contact using RB-TV
  - 800kHz bandwidth or less on any band
  - Including the new UK 70 MHz DATV band!
- £50 Amazon voucher each for both stations
- One way or two way contact
- See CQ-TV and the BATC forum for rules



Get out portable in the great British Summer and have some fun!



### Key points:

- Starts at 1pm on Saturday and runs until 7pm on Sunday
- Analogue or Digital ATV entries welcome
- BATC Contest covers all bands 50 MHz to 24 GHz with a prize for best DX using RB-TV (<800 KHz bandwidth)
- IARU Contest on all bands 432 MHz to 24 GHz.
- Full details at  
[http://www.batc.org.uk/contests/contest\\_news.html](http://www.batc.org.uk/contests/contest_news.html)
- Forum discussion at  
<http://www.batc.org.uk/forum/viewtopic.php?f=75&t=4137>

Please send entries to Dave, G8GKQ, [contests@batc.org.uk](mailto:contests@batc.org.uk)

---

### The Newbury Radio Rally



Sunday 21st June 2015

Newbury Showground, next to Junction 13 of M4, Berkshire

Open to traders at 8am and visitors at 9am

PARKING FREE

This is the 28th year of this enjoyable annual event that attracts visitors from all over Southern England as well as many regulars from outside the UK ! The Newbury Showground, being one of the biggest in this part of the UK, provides a great venue for this great day out. Whether you come to see amateur radio in operation or pick up a bargain, there is something for everyone!

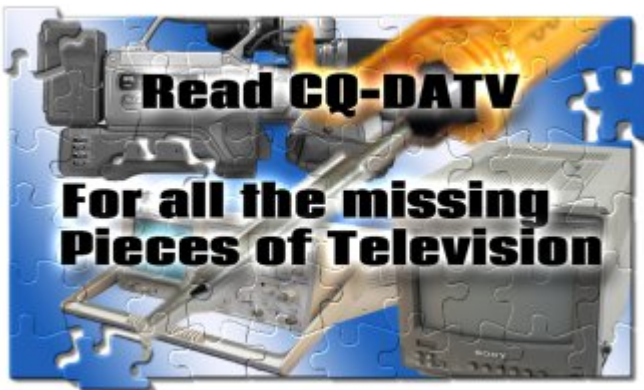
### TV amateurs making the future

In Gloevzin between Hamburg and Berlin the AGAF e.V. met on May 15 2015 for their AGM, this time with elections for the managing board. Again Prof. Dr. Uwe Kraus, DJ8DW, for president, Heinz Venhaus, DC6MR, for first chair, Rainer Müller, DM2CMB, for second chair and Karl-Heinz Pruski for secretary were elected. Jörg Hedtmann, DF3EI, was chosen to work for new AGAF hardware and software and for the integration of ATV into the HAMNET.

It was decided to print again a paper version of the member magazine TV-AMATEUR for an increased membership fee of 30 Euro, the cyber version is available for 25 Euro still. AGAF will promote projects to enhance the ATV net infrastructure, especially the HAMNET (Highspeed Amateurradio Multimedia NETwork) being an integral part of the ATV community by now. We see a merging of both technologies similar to broadcasting and Internet. AGAF will intensify this matter by gaining authors and contributors for TV-AMATEUR and conferences.

Homepage: [www.agaf.de](http://www.agaf.de)

**Klaus, DL4KCK**



### A little bit of humour

I have been in many places, but I've never been in Cahoots. Apparently, you can't go alone. You have to be in Cahoots with someone.

I've also never been in Cognito. I hear no one recognizes you there.

I have been in tolerable, but they couldn't put up with me there.

I have, however, been in Sane. They don't have an airport; you have to be driven there. I have made several trips there, thanks to my friends, family and work.

I would like to go to Conclusions, but you have to jump, and I'm not too much on physical activity anymore.

I have also been in Doubt. That is a sad place to go, and I try not to visit there too often.

I've been in Flexible, but only when it was very important to stand firm.

Sometimes I'm in Capable, and I go there more often as I'm getting older.

One of my favorite places to be is in Suspense! It really gets the adrenalin flowing and pumps up the old heart! At my age I need all the stimuli I can get!

I may have been in Continent, I don't remember what country I was in. It's an age thing.

Welcome to CQ-DATV 24 and the good news is we now have an ISSN number.(International Standard Serial Number)



### **Our shiny new identity**

So now CQ-DATV has become ISSN 2059-2191 and this number and its associated bar code will be on all our future issues. There were a few hairy moments when we were asked to explain the meaning of CQ, so it's a good guess there are no amateurs at the ISSN UK centre of the British Library. Well it is in Yorkshire, Oops - sorry Trevor.

What does this mean? Well we hope it will open a few more doors, we already publish on ISSUU.INC where you can read our latest magazine on line, along with lots of the larger glossy magazines you see on the shelves of your local news agent. This registration will also open the door to Google books so keep watching.

The total download counter for our magazine also passed the 94,000 mark last week, so we are on target for 100,000 downloads this summer, and they said "it wouldn't last". I think they had not reckoned with the CQ-DATV editorial team

who are really pulling out the stops to get ATV and DATV recognised as a hobby across the world.

Also since the last issue, we have been putting together a master PDF of all the editions of CQ-DATV. This will enable you to search for items in back issues by using the 'search' or 'find' facility in you PDF viewer. (usually ctrl-f or ctrl-s).

What else is new? Well, it's June and the Region 1 IARU contest is now in June. It starts at 1pm on Saturday, June 13th and runs until 7pm on Sunday and is for both analogue and digital ATV. It also covers all the bands from 432MHz to 24GHz.

Entries for the IARU International Contest should be submitted using the Excel (or Calc) template here. Note that you will need to 'Enable Macros' for all the calculations to work on this spreadsheet:

[http://www.batc.org.uk/contests/ATV\\_contest\\_log\\_-\\_ATV\\_yourcall\\_YYYYMMDD.xls](http://www.batc.org.uk/contests/ATV_contest_log_-_ATV_yourcall_YYYYMMDD.xls)

The other hot news is F6DZP has come up with a simple USB dongle to receive DATV on a laptop. It uses a NIM module along with the USB module all the DigiLite builders are familiar with.

The USB module needs reprogramming, but if you have trouble drop the [editor@cq-datv.mobi](mailto:editor@cq-datv.mobi) a line and we will look at buying some, programming them and making them available to our readers.

The NIM modules are a little more tricky. Jean has published a list of tried and tested modules, but there are others that he suspects will do the job. Ken will enlighten you all further down the pages of this issue.

Fabrizio IW5BDJ has been looking at Fabrizio IW5BDJ has been looking at CAD software for PCB manufacture.



Mike G8GTN has put an on-screen teletype together. Tom W5KUB took his ATV streaming kit to the Dayton Ham feast and we have published the answer to our Skills Puzzle and set you another one just to keep all those neurons active... but I won't spoil it for you.

Please read all this and much more and enjoy CQ-DATV 24.

**CQ-DATV Production team**



**CQ-DATV**

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# DKARS MAGAZINE



**A SDR TRX from Russia!**

In deze editie onder meer:

- Raspberry Pi SSTV Camera
- Een vier-(en zes) meter Yagi
- Dodelijke Radio Signalen
- Morse, hoe het begon
- Radioelektronicaclub



**DKARS**

**Dutch Kingdom Amateur Radio Society**



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mei 2015 editie 11



## Dayton on stream

### Trevor reports

Every May Dayton Ohio, plays host to the world's largest Hamvention. The original announcement said this was not going to be streamed, but that seems not to be the case with Tom W5KUB and his streaming site. Transmission first opened up, the day before the rig day, 13 May from Toms car as he journeyed to the Venue and it carried on through the rig day. Yes that is a Tower and it telescopes.



Dayton is big enough to need a scooter to get around, Trevor attended in 1988 and spent three days walking around and three nights attending ATV lectures.

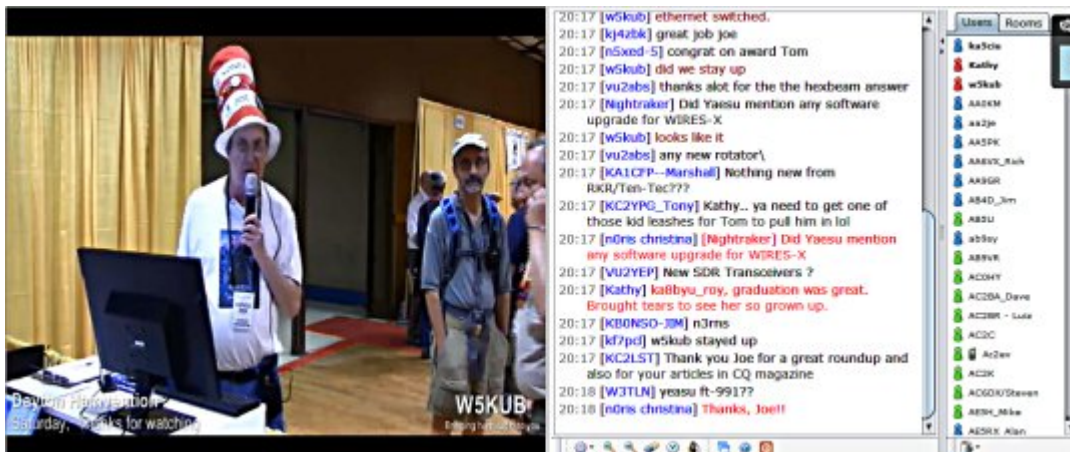
This is Tom trying out the new method of getting around.



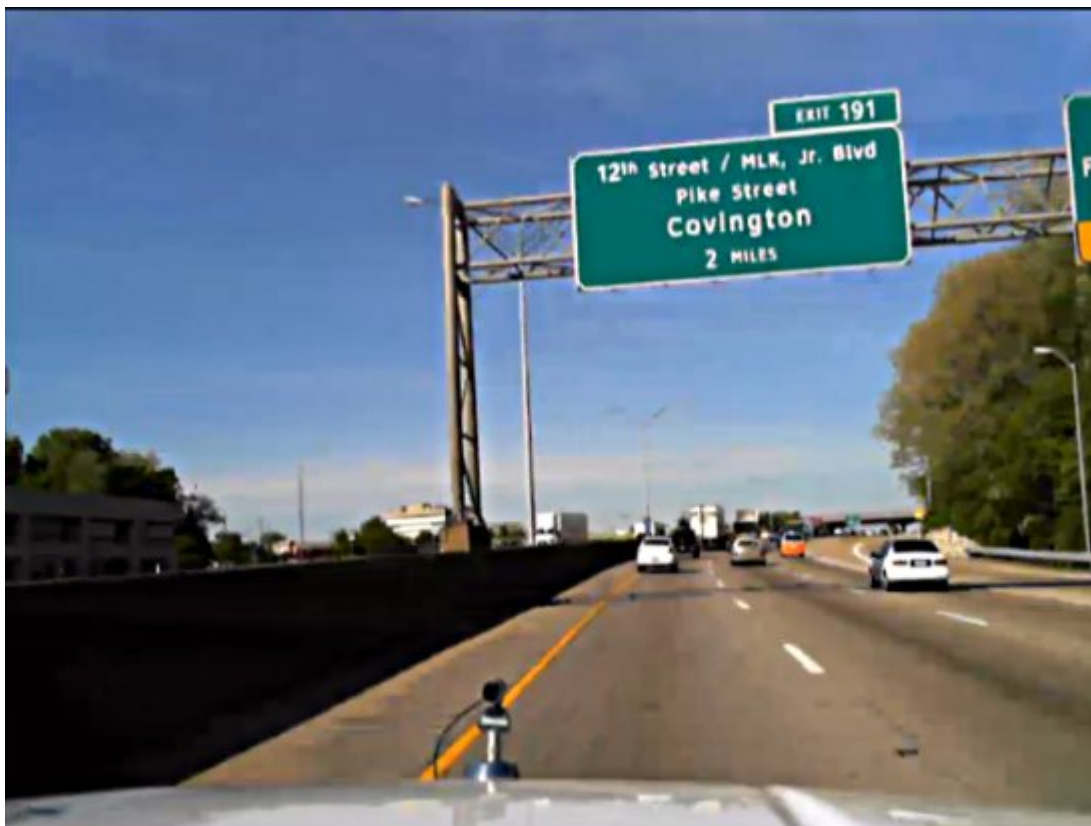
The transmission's are accompanied by a two way text so you can ask questions. This is not Google chrome friendly and you have to use a patch to make it work and it does have ads. However I am informed if you use Firefox the text does not need a patch and you can switch in the add blocker.







There are many colourful characters and lots of prizes to win, one of which has already been collected by one of our readers, G3ZHI, Ian, who has won a three year subscription to QST. Well done Ian.



Fall 2014

Volume 27 - No 4

ISSN 1042-198X  
USPS 003-353

SINGLE ISSUE  
\$6.00 USA  
\$7.00 CANADA  
\$9.00 ELSEWHERE

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**Published by ATV Quarterly tel (909) 338-6887 email:  
[wa6svt@atvquarterly.com](mailto:wa6svt@atvquarterly.com)**



By Richard Carden VK4XRL

First an update from my article in CQ-DATV22 where I introduced my efforts to transmit DVB-T HD using the HDMI input on the modulator. The concern I had was that the modulator wanted to update and re-set when switching HDMI inputs sources. That wouldn't work in a repeater situation where the incoming signal would drop out before it switched to another input. With a couple of emails to PVI product support it brought to light that changes on the modulator HDMI input does require it to re-set. Answer from PVI was:

- *every time you change the resolution on the HDMI input, the encoder must reset*
- *every time you disconnect / reconnect (switch between) HDMI signals, the HDMI protocol must be renegotiated*
- *component analogue input does not require renegotiation*
- *make sure to feed a constant HDMI feed, so the HDMI does not have to detect and renegotiate and re-initiating the encoding*
- *any HDMI device must redo the negotiation ( stop and start ), this is by the HDMI technology itself).*

I had also wondered what would happen if I had used SDI inputs would the same thing happen. Anyone with more experience in these areas please e-mail the editor so that we can all learn from each other.

However having been told that the component input would be ok in this regard and as it happened I did have three 4 X 1 video switchers and one stereo audio switcher (you need to use the analogue audio inputs when using component video inputs on the modulator - see figure 1).

These four switchers are daisy chained together for switching each output including the audio to the modulator inputs.

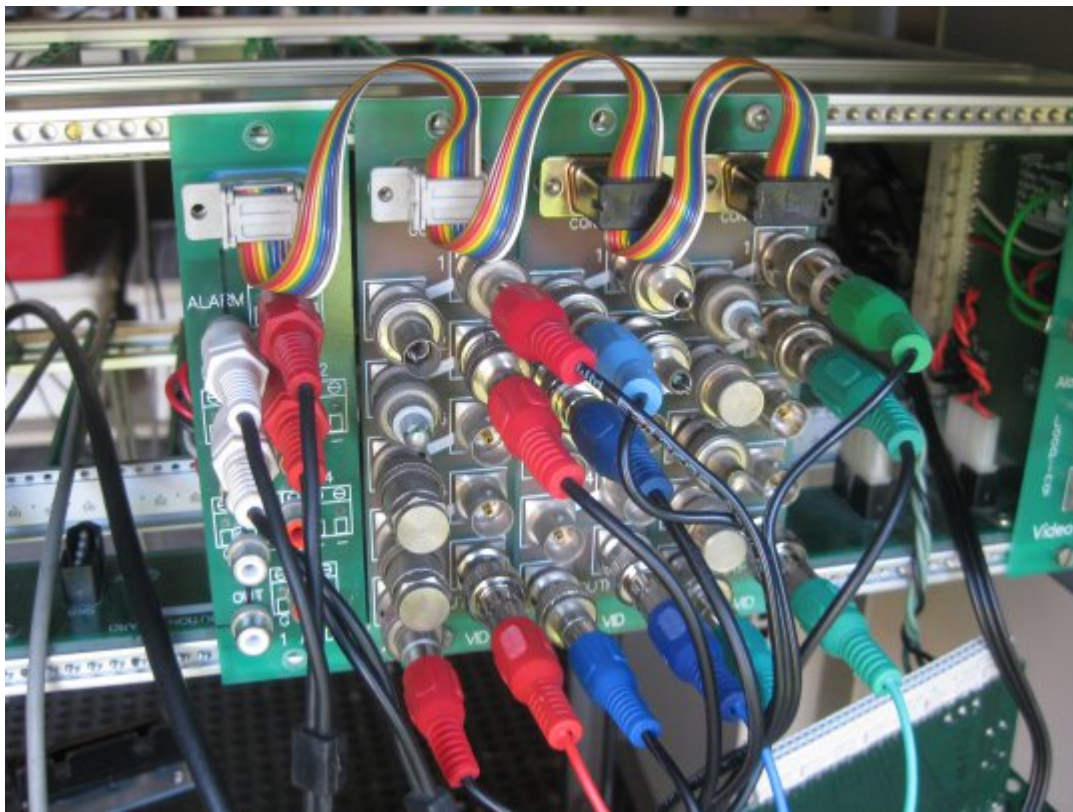


**Figure 1**

I managed to find three sources with component outputs that I could use to checkout this arrangement. It worked well and HD, either 720/1080, was transmitted. As you can see the wiring and plant is increased three fold to obtain the same result with HDMI (See figures next page).

### What's your reference?

Another interesting topic came to light during discussions in that some repeater controllers have no way of setting reference levels especially audio. This was the case with our local repeater when it was decided to replace the old controller that I had built and provided faultless operation over the past 7 years since going digital.



**Figure 2 above - The increased wiring**



**Figure 3 top right - A screen close-up from the STB transmitting HD 1080i**

**Figure 4 bottom right - Off air picture showing received signal from STB on 446.5MHz 1080**





As a professional I have always had to have some form of reference being it either video or audio. Video is easy in away as it only requires colour bars where I tend to use 100% bars to ensure it meets all technical requirements. I have always maintained that a repeater must be transparent as possible at all times. Other test signals of cause could be used such as stair-step, sawtooth or modulated stair-step where it's helpful to check on differential gain etc. The only problem I have encountered is the FM receiver such as the old B-Mac receiver fitted with a PAL decoder board. Because we only use +/-9 MHz which is around half the normal bandwidth of the satellite service we can only get around 1/2 V P/P or 0.7V P/P with the internal gain set FCW. In this case you will need a VDA to provide the extra gain required, some of these VDA's can be fitted with a filter if required to remove the Audio sub-carriers as well.

The audio also needs to have a reference to set the gains to be the same for all inputs. But what do we use?

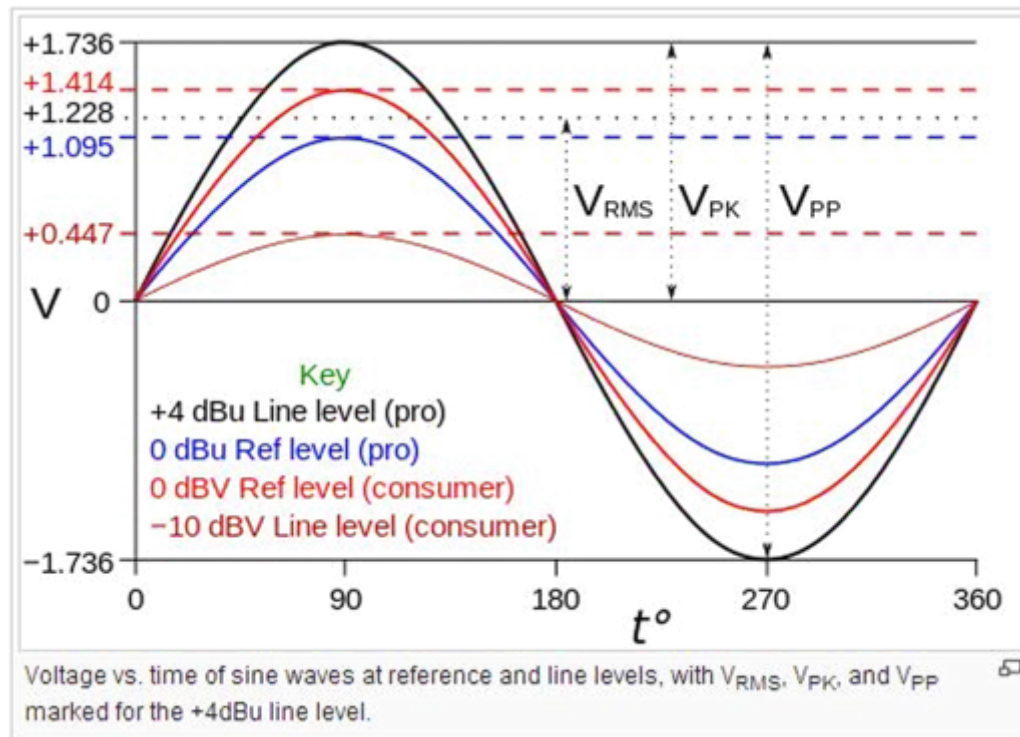
Reference levels around the different television stations vary which in itself is not a problem as long as all levels are set to that standard within the plant. This is where tone is used set to around 400 or 800Hz, normally the left channel is set for continues tone and the right channel has interrupted tone so as to identify the different audio channels. The reason for selecting 400/800Hz is that it is not affected by any pre-emphasis that you may encounter. There are a number of different levels you could use like +8dbu or +4dbu as per the television stations. You could also use 0dbu, 0dbV or -10dbV. Whatever you use some form of metering is a must as is a tone generator.

From Wikipedia, the free encyclopaedia,

[http://en.wikipedia.org/wiki/Line\\_level](http://en.wikipedia.org/wiki/Line_level)

the following graph gives you the peak and peak to peak voltage levels encountered in most setups.

Most consumer equipment use -10dbV, however I have opted for 0dbu level as my station level where the peak to peak voltage is 2.19Vp/p. This level is a much easier level to use. Likewise it's also the level I use to setup the repeater system. However where consumer equipment is used using -10dbV you will need some sort of small audio amplifier to set the required levels. The tone generator should be set to 2.19Vp/p (2.2) and all other levels matched to it also your metering arrangement should be so calibrated as well.

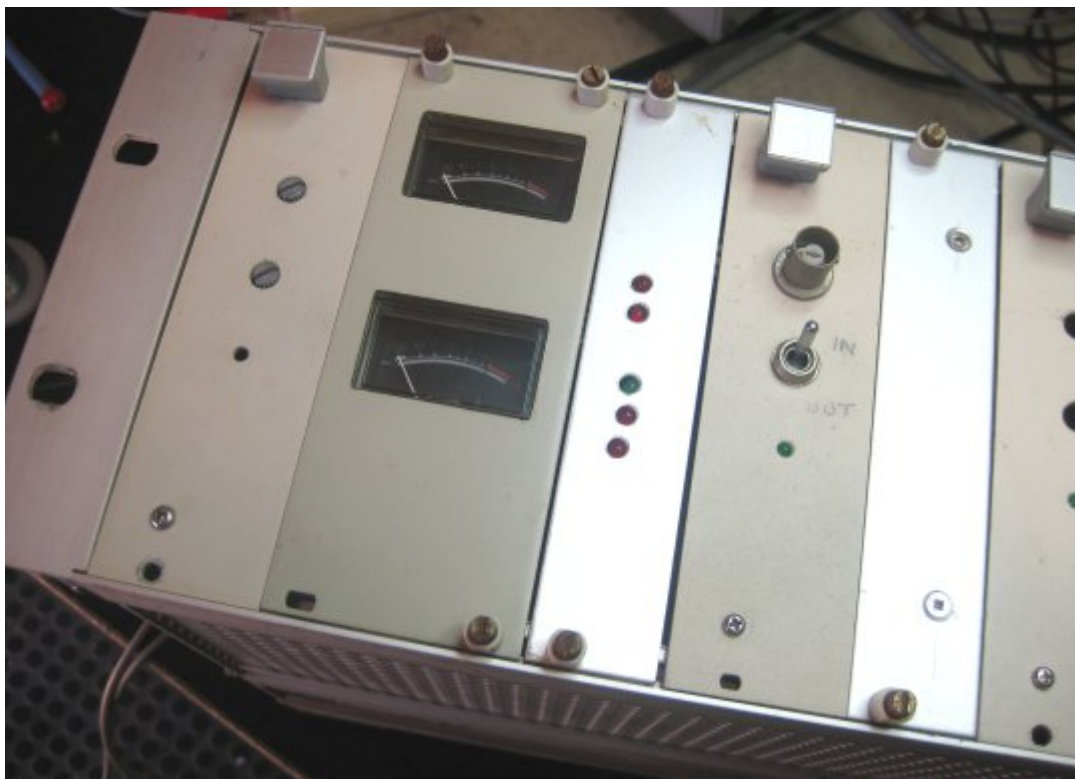


I have always maintained that repeaters for ATV should be as transparent as possible and that should be easy now we run digital. In that way where people don't have the equipment to set their levels you can now do so via the repeater.

The repeater can operate with its own reference as long as all inputs can be set to it just like your home system.



Setting your FM Transmitter is fairly straight forward where your reference tone level is set to  $\pm 20$  kHz deviation with the internal audio gain adjustments (note if metering is used on the transmitter that should also be set to reference on the meters - see figure 6).



**Figure 6**

Setting digital is a little more complicated but for amateur requirements we can easily set levels by checking on tone from a satellite receiver and then adjusting our own digital transmitter audio levels to be the same.

If the repeater has been setup in the same way using its own reference level then the repeater FM receiver and digital receiver should be set to that reference using the receivers own audio level controls.

If this is done correctly and if you haven't any way to set your own levels it can be done by monitoring the repeater audio via a CRO or metering system.

Within the repeater switcher unit one has to be careful in setting the overall levels both for video and audio. When prototyping the newer controller system where we used a combined video and audio switcher from Sanyo, two problems came to light.

Both video and audio had internal amplifiers giving a gain of two. The video was fixed via a voltage divider and emitter follower feeding a sync tip clamp circuit.

The audio however in the original configuration was fed via an operational amplifier with a gain of two. We therefore had to be careful we didn't overload and cause clipping leading to distortion. This was later rewired as a voltage follower reducing the problem somewhat.

My own setup at my QTH consists of a video and audio switcher monitoring the,

- (1) Station output
- (2) Computer (using VMix)
- (3) FM receiver and
- (4) Digital receiver

Monitoring of all audio level is done via a OSD unit where all inputs are then calibrated to my station audio reference.

## *"CIRCAD" a program old but still valid*

**By Fabrizio Bianchi IW5BDJ**

There are many programs to design printed circuit boards (PCB), but all "Evaluation" versions have some limitations. Some limit the maximum size to a few cm square others limit the generation of Gerber files, other printing PCB, others the routing from the wiring diagram etc. etc. So much so that to operate professionally on circuits as amateurs we need to build we have to resort to pay versions.

If we pay the money, very high, we solve everything, we are meeting Eagle, Orcad, and all the others.

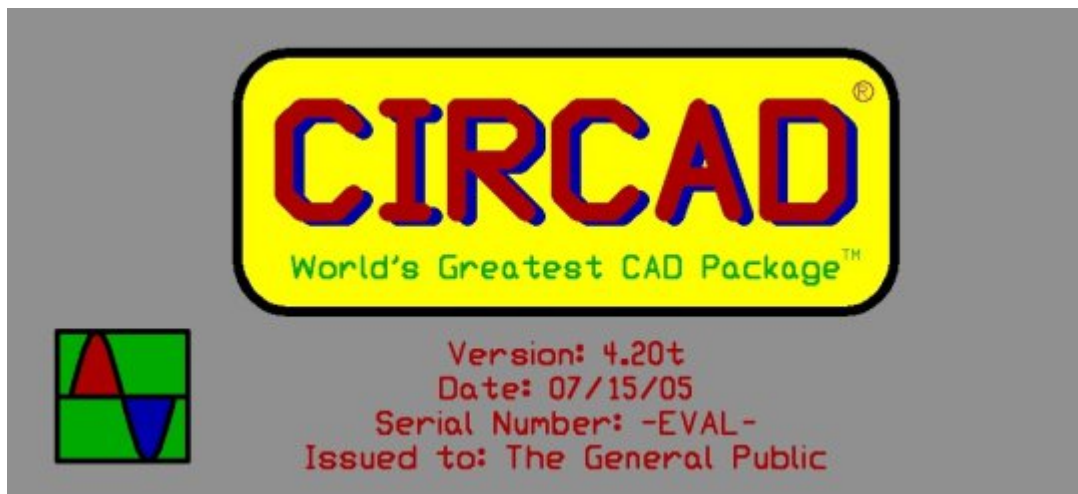
Then we find that these programs once purchased are of enormous complexity and takes courses to be able to use, but it also takes a continuous use because otherwise soon forget the syntax used.

But the amateur radio does not use the 365 days' year these programs, so when the need arises has forgotten everything and have to start over with the instructions.

What I am about to describe is certainly not the best system ever, but an easy way to reach a professional final product easy to learn without resorting to strange games of software cracking, which I do not like.

CIRCAD98 is available in various "Evaluation" versions under Windows, that allows to realize a PCB with much ease.

In a few days on Skype contact with two people who knew Circad well, I learned to make the first prototypes, Antonio Musumeci IK1HGI and another great, Alberto IW5ECU, with whom I later worked together with in the 1970s under the guidance of Masters life and technology.



**Figure 1 - Such is the version under Windows**

The limitation of this program is that it does not have the connection between schematic and PCB and apparently does not generate the Gerber files.

The routing if you do not have to make circuits at the level of the microprocessor is not a limit for us.

Usually the amateur radio does not have boards with thousands of components, but rather simple circuitry performs them or copy / edit existing master, so it can do without the routing.

Many times though, some of the double-sided circuits with through holes, and this limits, if not making it impossible to build in house the circuit.

In the case of the through holes you can find solutions with rivets, but little professional and totally inefficient at high frequencies.

So in these cases, the radio amateur must address the professional firms that build PCB.

There are many companies in the world today who build prototypes for a few dollars, but require the Gerber file.

Circad98 as it appears is not able to generate this file in the "Evaluation" version, only spending \$ 1000 and more can do this.

From the Gerber file any company that builds PCB is able to do your circuit board without any other information, because in it has the data for the machine to work for the production of PCBs in any wall of the world.

CIRCAD98 "Evaluation" does not generate the Gerber file, but older versions, such as the one that runs under DOS, we find generates the Gerber files.

It is the version CircadDos3.52 "Evaluation" free from everything, so legal.

To use this Dos version today is very difficult, being accustomed to the comforts of programming that offers a Windows GUI.

The problem is that the files produced with versions of Circad under Windows are not compatible with the old version CircadDos3.52.

Also on modern computers with Windows7, it will not run older versions of programs in Dos.

Here we aim to describe a system to promote the realization of the File Gerber working on a computer with Windows 7 and with programs CIRCAD98, and Circaddos3.52 "Evaluation".

The tests were made on two PCs with both Windows 7, 2 Gig of Ram Intel (R) Core (TM) 2, 2.5 Ghz 32 Bit.

## What we must download the PC with Win7

First you need to download Circad98 ver4.20T here: [Circad 4.20T per Windows 98/XP/Vista?](#) (.ZIP - 5.4 Mbyte)

The official version can also be downloaded from the link HoloPhase: <http://www.holophase.com/> but it's the same type of thing.

Then we download also CircadDos3.52 here: [Circad 3.52 per Ms-Dos](#) (.ZIP - 384 Kbyte)

and finally the converter here: [Circad Converter 1.1](#) (.ZIP - 22 Kbyte)

From this site <http://tattik.altervista.org/circad.html> we can also download all files that provides, in the course of Circad 5 lessons which is very important and libraries.

At this point our PC needs an Dos emulator otherwise Circad version 3.52 does not run, the emulator I have chosen is an free emulator and is called DosBoX0.74, you download here: <http://sourceforge.net/projects/dosbox/files/dosbox/0.74/DOSBox0.74-win32-installer.exe/download>

It's a program porting the PC back in time and making it compatible with old versions of programs in Dos.

Finally we have to download a .dll to make our converter that is designed only for XP run on Win7. The .dll to download is located at this link: <https://support.microsoft.com/en-us/kb/180071/> It is a Microsoft site, so very safe, no virus.

Click Msvbvm50.exe about half way down the screen, the file will automatically download and once launched will install the .dll and allow the converter "CirConv11" to operate smoothly.



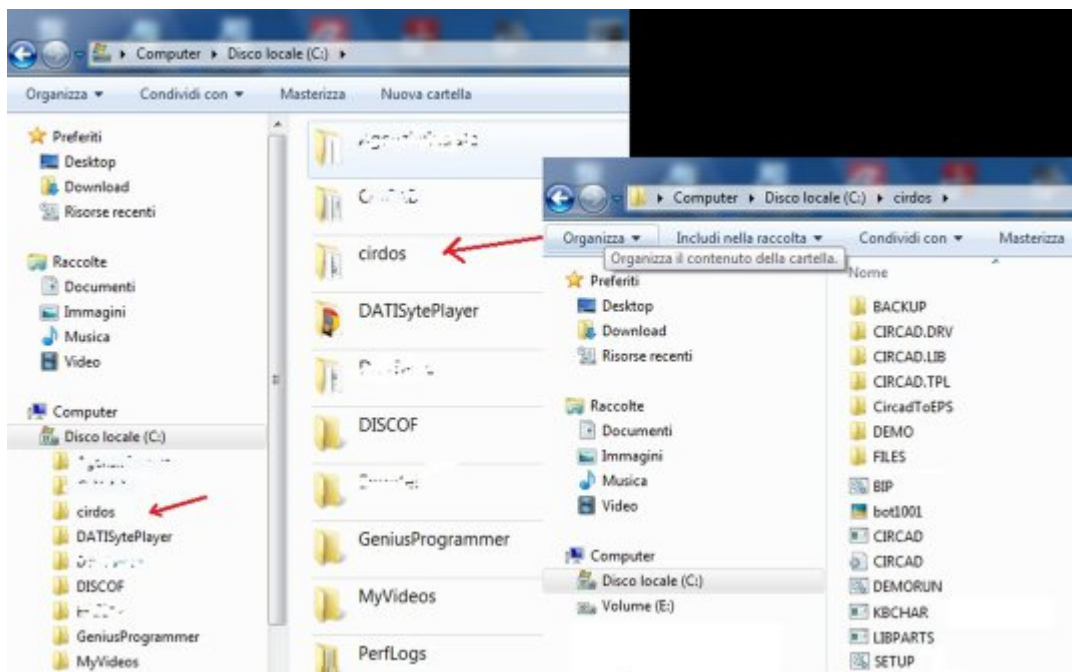
## Installing downloaded programs

Launch from Download directory where you downloaded the programs Circad 4.20T, this Circad98 installs under the directory C: \ Program Files \ Circad98 \.

Launch after "Msvbvm50.exe" to install the missing dll.

Now unpack into the directory C: \ Program Files \ Circad98 converter called "CirConv11", run it and see that it gives no errors, if it does not perform these tasks well, try again.

Install in a directory under C: \ called "Cirdos" (short names because Dos manages a few letters) version of Circad 3.52 for MS-DOS.



**Fig 2 Directory "cirdos" with inside the program CircadDos3.52 unpacked.**

Launch now DOSBox0.74-win32-installer.exe and install this program by following the instructions.

Once you install this program it generates an icon on DeskTop "DOSBox 074" that we get a window throwing Dos and a prompt that says Z: \>

If this is OK write "exit" to return to Windows mode. Everything should work.

## Let's see how to create a PCB and obtain the Gerber file

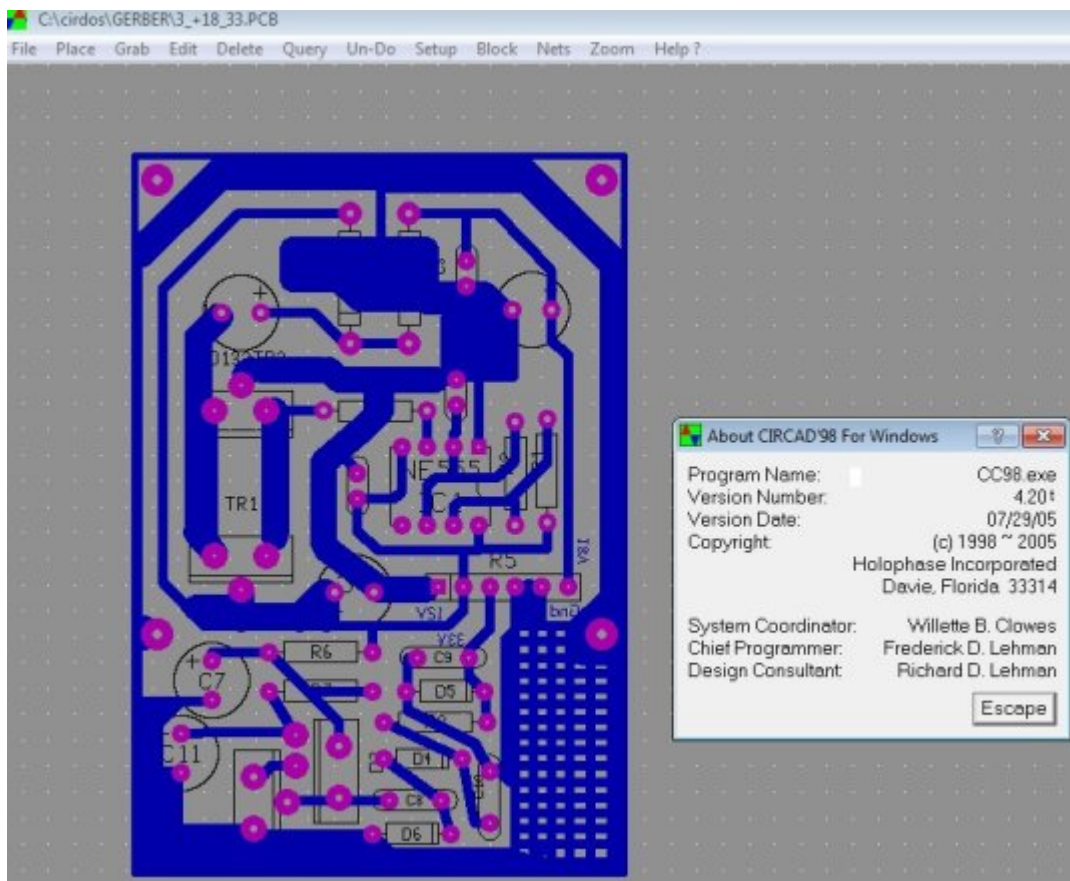
With installations above and after giving a look at the lessons previously downloaded, for those who are using Circad98, we can begin to work and do all the circuits we want.

We have to remember that during the drafting of the layout of the PCB with Cirrcad98 not to use the 'Place Fill' instruction, because the DOS version does not have this instruction and the converter does not support it.

To make the filling ground or another we have to rigorously use the command Place Line or Place Orthogonal, also should not be placed dimensions to PCBs because this command is not present in the version Dos.

After finishing circuit, also simple to try, you save with extension .pcb the directory where the converter CirConv11.exe

Now launch the program CirConv11, we get a window (Fig 4) that we will see on the left the file you just made in Circad98. Clicking on the file that will move the box to the right of the window, at this point, just click on "Convert & Save" will generate a file that will be named the same as yours but with inception a "3\_" that will mean that a file is compatible with the old version of Circad dos.



**Fig 3 The CIRCAD98 circuit developed under Windows7**

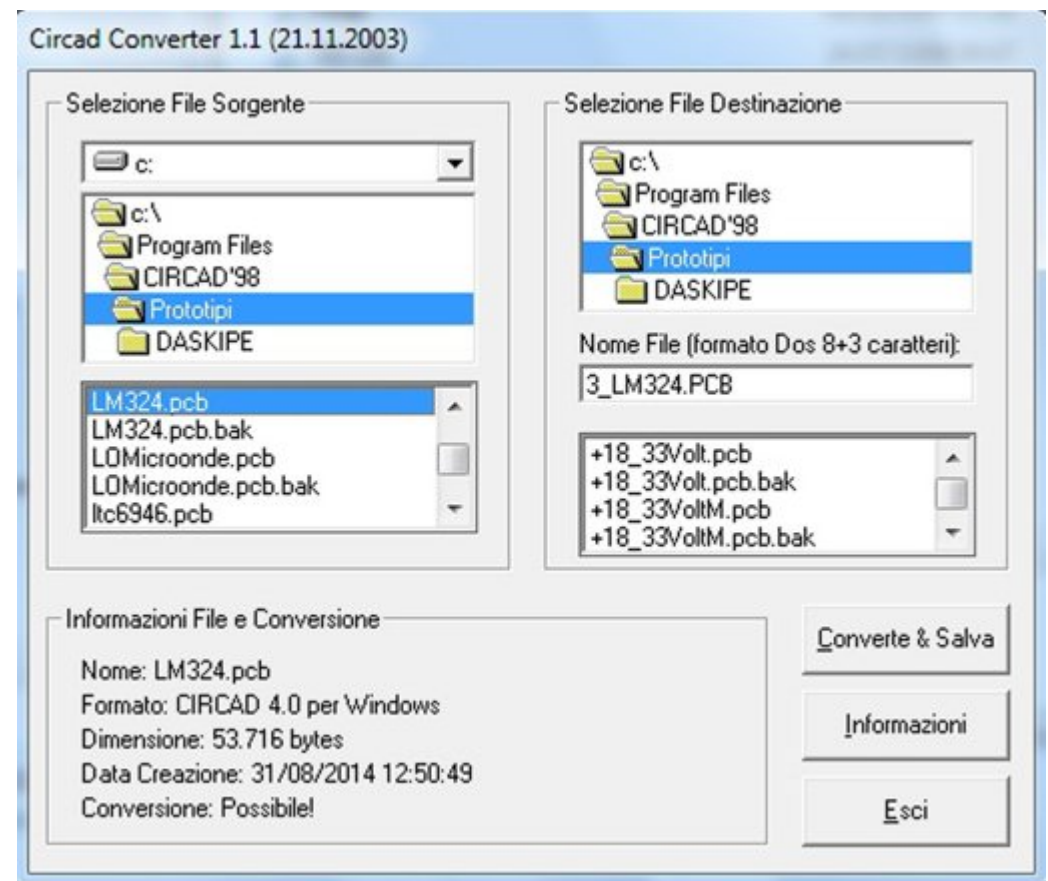
Now move this file from the directory where you put C: \ Program Files \ circadd98 to the directory C: \ cirdos and launched the DOSBDOSBOX0.74 emulator from the icon on the desktop, you will see a black window that says in the Dos Command Prompt :

Z:\>

We pass to full screen by typing "Alt + enter"

Now to find our directory "cirdos" write:

Z:\> mount c c:\ cirdos followed by "enter"



**Fig 4 The converter, CIRCAD98 to CIRCADOS3.52, turns the sample file from LM324.pcb to 3\_LM324.pcb**

We will have this answer:

Driver C is mounted as local directory c: \ cirdos \

Now we write:

C: and follows "enter"

we will have this answer:

C:\>

so we are in the directory C: \ cirdos



**Fig 5 This is the window of Dos emulator DOSBOX0.74**

Just click "circad" that will start the program in Dos. If everything is working well we will have screen Circad in Dos version also with the mouse operated.

Opening "Open File" we will see our files previously converted As 3\_XXXXX.pcb, we open it and if everything was done correctly opens as in the previous version 98.

At this point of "Open File", further down there is "Gerber Out", just click on this item, confirm and you're done.

In the directory C: \ cirdos, you will find 10 files that will have the name 3\_XXXXX, but with extensions .BOT, .BSM, .bss, .DRL, .LST, .SYS, .TOP, .TSM, .TSS and .PCB. With these the manufacturer of printed circuit boards will draw make your circuit board.



**Fig 6 CircadDos3.52 opening under DosBOX0.74**

The system is a little complex but that will take you to a professional solution with all programs in "Evaluation" and therefore free without using any crack and go outside the law!!

*Article written by:*

*Fabrizio Bianchi IW5BDJ with the collaboration of:*

*Alberto Ciampa IW5ECU*

*Antonio Musumeci IK1HGI*

*The ideas and programs were taken from the website:*

<http://tattik.altervista.org/>

*written by Michele Guerra who I thank.*

**Greetings to all ..... and on to the next project.**



# *DATV-Express Project - April update*

## *report*

**by KenW6HHC**

DATV-Express efforts remained slow in April

Art WA8RMC has been testing a 64-bit version of draft DATV-Express v2.04 deb file that was built by Charles G4GUO. The main changes planned for v2,04 are:

- (1) extend the range of PID values (correct PID MSB masking bug)
- (2) add  $\sin(x)/x$  compensation to improve the OFDM waveform used in DVB-T protocol (suggested by Ron Economos W6RZ)
- (3) a few minor fixes involving UDP support
- (4) support for Hauppauge HD-PVR encoder

So far his testing has gone well and for the first time, Art is able to use the DATV-Express to transmit to the WR8ATV DVB-T repeater because the PID values can be set to match the default values used by HiDes UT-100B transmitter. Art encountered two lessons about DVB-T during the testing:

(a) First, DVB-T requires a higher signal-noise ratio to be received at the WR8ATV repeater than when using DVB-S protocol. Art has to crank up the power at home higher (with resulting large spectral regrowth "shoulders") in order to hit the repeater. This overdriving of the amplifier is not good but a lower signal level won't make it.

(b) Second, the HiDes HV-110 receiver used for DVB-T at the WR8ATV repeater is NOT very "robust" for an unattended

repeater. Art really doesn't like this HiDes receiver and recommends "... Don't put it in unattended repeater service. Had to go there to the repeater and manually reset the HV-110 again".

Art still needs to finish all the planned testing on the 64-bit v2.04 software.

It turns out that Art really wanted the ODROID version of v2.04 for his home station instead of the 64-bit version. Since Charles G4GUO can not build and test reliably with his set-up on ODROID, Ken W6HHC switched gears. Originally Ken was going to build the 32-bit version of v2.04 deb file, but instead started to build a deb file for ODROID U3. After six months, Ken was a "bit rusty" on building with QT5 and with debreate. Finally, Ken was able to successfully build a v2.04 draft version of deb file for ODROID using debreate package builder. One secret to good testing of a deb file is to NOT install it and test on your development system, but try to install and test on a "fresh image" of the operating system (without all the development tool present). So Ken has now regression tested the v2.04 deb and tested that that the extended PID values work fine on ODROID U3. The remaining tasks before releasing v2.04 for ODROID are:

- 1) Start the UDP feature testing without Express\_Server
- 2) Then start HD-PVR testing (plan to order Hauppauge model 1228 "blue ring" this weekend on e-bay.)
- 3) Then plan to test UDP testing using Express\_Server
- 4) Then plan to update User Guide for ODROID

Charles G4GUO has been testing streaming video from the Logitech web camera connected on a Windows PC using VMIX and sending the IP stream to the ODROID running a DATV-Express exciter. The MPEG2 encoder codecs come from the

Hauppauge WinTV CD-ROM (although no Hauppauge encoder is actually installed). Also, he has been receiving IP streams via WiFi to a iPhone loaded with VLC.

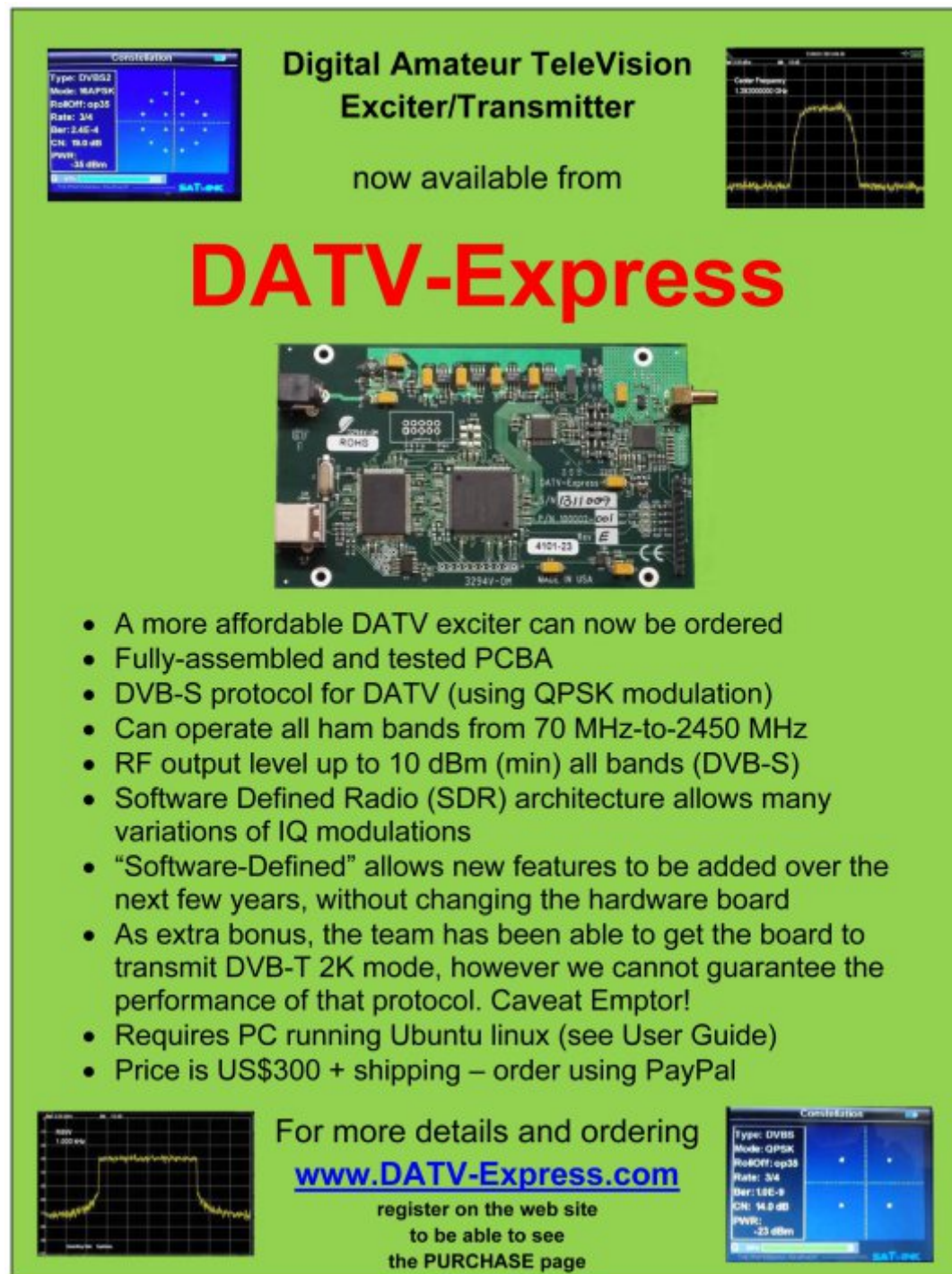
Art WA8RMC will soon be off the Dayton HamVention to demo ODROID with DATV-Express.

**"project is set to slow speed"....de Ken W6HHC**



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Issue 13- July 2014



## Digital Amateur TeleVision Exciter/Transmitter

now available from

# DATV-Express



- A more affordable DATV exciter can now be ordered
- Fully-assembled and tested PCBA
- DVB-S protocol for DATV (using QPSK modulation)
- Can operate all ham bands from 70 MHz-to-2450 MHz
- RF output level up to 10 dBm (min) all bands (DVB-S)
- Software Defined Radio (SDR) architecture allows many variations of IQ modulations
- "Software-Defined" allows new features to be added over the next few years, without changing the hardware board
- As extra bonus, the team has been able to get the board to transmit DVB-T 2K mode, however we cannot guarantee the performance of that protocol. Caveat Emptor!
- Requires PC running Ubuntu linux (see User Guide)
- Price is US\$300 + shipping – order using PayPal

For more details and ordering  
[www.DATV-Express.com](http://www.DATV-Express.com)  
register on the web site  
to be able to see  
the PURCHASE page



## Looking at MiniTiouner project to receive Narrow-bandwidth DATV

**Jean-Pierre F6DZP**

This article described a project for a USB DATV receiver built by using a Samsung module (called NIM), two three-input Nand gates (74HCT10), a USB module and [4] some voltage regulators to deliver DATV video and audio via the USB input to your PC or Laptop.

The information was compiled from freely available information on various web sites and user forums. However, the day after publication, we received the following email from F6DZP and although we feel that, for a free magazine, we have done nothing improper, we respect his wishes and have decided to withdraw the article.

Hi Trevor, I am not happy, you are pirate and publish my photos, text and ideas without be allowed to do it. I am very angry with you. I could not think that some OM without any simple correction could do that. It is not also the first time I see Ken W6HCC taking someone work to publish with his name. Please stop it for download! Jean Pierre F6DZP

## CAT15 - Sept 5/6<sup>th</sup> 2015



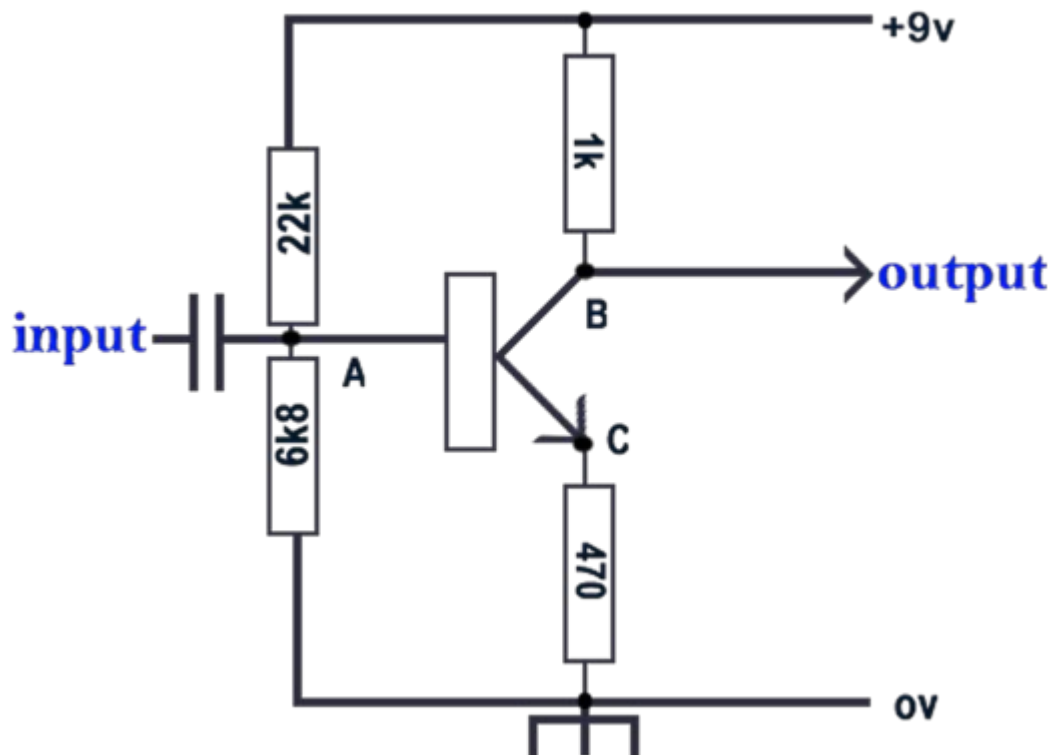
- 2 day program including talks and demos
- Test and measurement area
- Members flea market and demo area
- RF and specialist traders
- Presentation of BATC RB-TV awards

Finningley Amateur Radio Club – Sandtoft DN8 5SX

- Just off the M180
- 5 minutes from Robin Hood International Airport



### Answer to the CQ-DATV 23 Puzzle



We asked -:

The transistor in this circuit is silicone and you are not sure if it is working correctly.

So what voltages would you expect at A, B, and C and what sort of a stage gain would you expect (one decimal place is enough).

It is permitted to ignore base current, which would be very small, when doing your calculations.

The starting point is to work out the base voltage (point A) the current through the potential divider is 312mA (9v divided by 28.8 \*1000 to get mA = 312mA).

$312 \times 22 = 6.8\text{v}$  (voltage drop across the 22K resistor)  $9\text{v} - 6.8\text{v} = 2.2\text{v}$  The base current would also flow through the 22k but you were told to ignore this so point A = 2.2v.

The transistor is silicone so we would expect the emitter to be 0.7v below the base so  $2.2\text{v} - 0.7 = 1.5$  C = 1.5.

1.5v across 470 ohm is the current through the emitter and (incidentally the collector too)  $1.5 \text{ divide by } 470 = 3.2\text{mA}$  so 3.2mA through 1k will be a voltage drop of 3.2v  $9\text{v} - 3.2\text{v} = 5.8\text{V}$  at point B.

The stage gain is the ratio of the collector resistor over the emitter resistor as the same current flows through both and if it had been an emitter follower the stage gain would be unity so  $1000 \text{ divided by } 470 = 2.12$  let's call it a stage gain of 2 as we probably would build this out of 10% resistors.

A = 2.2v B = 5.8v and C = 1.5v and a stage gain of 2.

**In this issue we have a slightly less mathematical problem.**



This amplifier is producing a stage gain sufficient for the task, but does not deliver that gain when the input and outputs are loaded. Describe how you would measure the input and output impedances of the unit.

Answers to the [editor@cq-datv.mobi](mailto:editor@cq-datv.mobi)



# Antenna Modeling Software

By Ken Konechy W6HHC

Reproduced from the Orange County Amateur Radio Club newsletter. [www.W6ZE.org](http://www.W6ZE.org)

Allow me to start by explaining what Antenna Modeling software can do on your computer:

- Teach you more about antennas by letting you to experiment on a PC
- Teach you how to design better antennas
- How to predict antenna performance
- How to "tune" the antenna design or the antenna installation for performance

Investing about \$90 (£60) in a software program like EZNEC to model ham antennas and investing a couple weeks of evenings to learn how to use the Antenna Modeling software can be a good way to homebrew design and build your own antennas. Or even modify/improve a commercially built antenna that you already use.

## Describing an Antenna in Software

The most significant step to use Antenna Modeling software is to describe the antenna you want to analyze to the software. Figure 1 shows how a 40M Inverted-Vee antenna can be described using the EZNEC software. There are two "wires" described by the two lines (rows) of numbers you see in Figure 1. One row of numbers is the end points for the left wire. On row one, that wire slopes from 50 ft. above ground (the Z coordinate) down to 37.6 feet above ground at the other end-point for that wire. Row 2 describes the second sloping wire that connects to the feedline (coax, ladder-line, etc.).

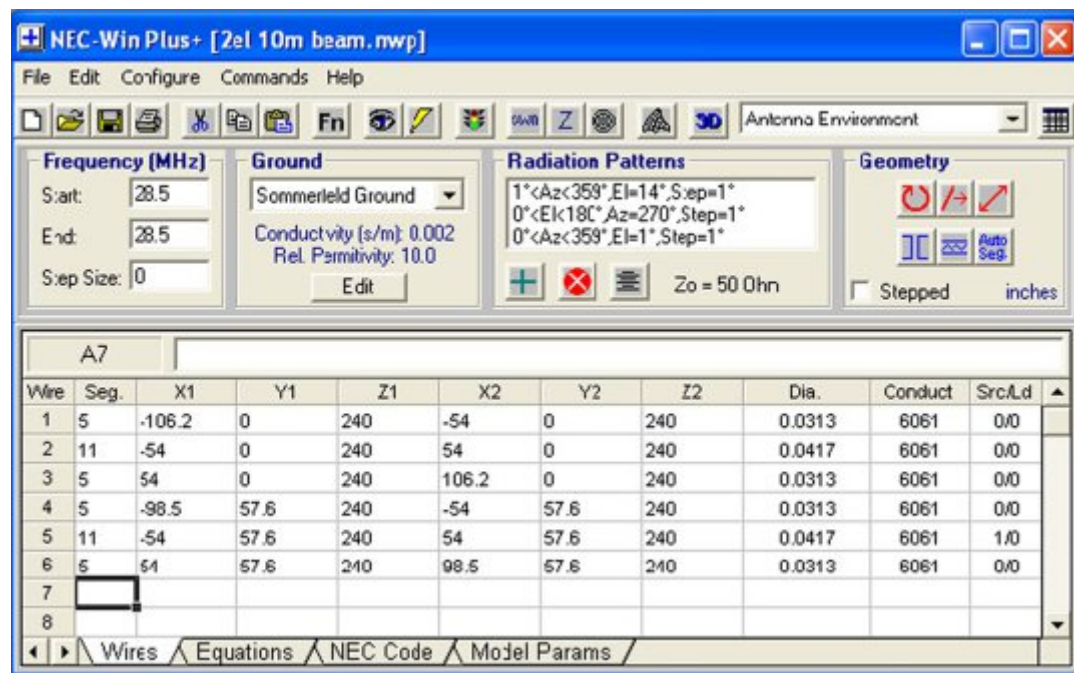


The EZNEC software window displays a table of wire coordinates for a 40M Inverted-Vee antenna. The table has columns for Wire No., End 1 (X, Y, Z), Conn, End 2 (X, Y, Z), Conn, Diameter (in), and Segs. Two wires are defined, both with a diameter of #12 and 25 segments. Wire 1 starts at (0, 0, 50) and ends at (0, 30.6, 37.6). Wire 2 starts at (0, 0, 50) and ends at (0, -30.6, 37.6).

No.	End 1			Conn	End 2			Conn	Diameter (in)	Segs
	X (ft)	Y (ft)	Z (ft)		X (ft)	Y (ft)	Z (ft)			
1	0	0	50	W2E1	0	30.6	37.6		#12	25
2	0	0	50	W1E1	0	-30.6	37.6		#12	25

Figure 1 - EZNEC Software Describing a 40M Inverted-Vee

Figure 2 describes a 2-element 10M beam where each element is constructed from three pieces of Aluminum tubing that have different diameters of tubing. The two smaller-diameter pieces of tubing for the element end pieces slide inside the larger-diameter tube that is used at the center of the element.



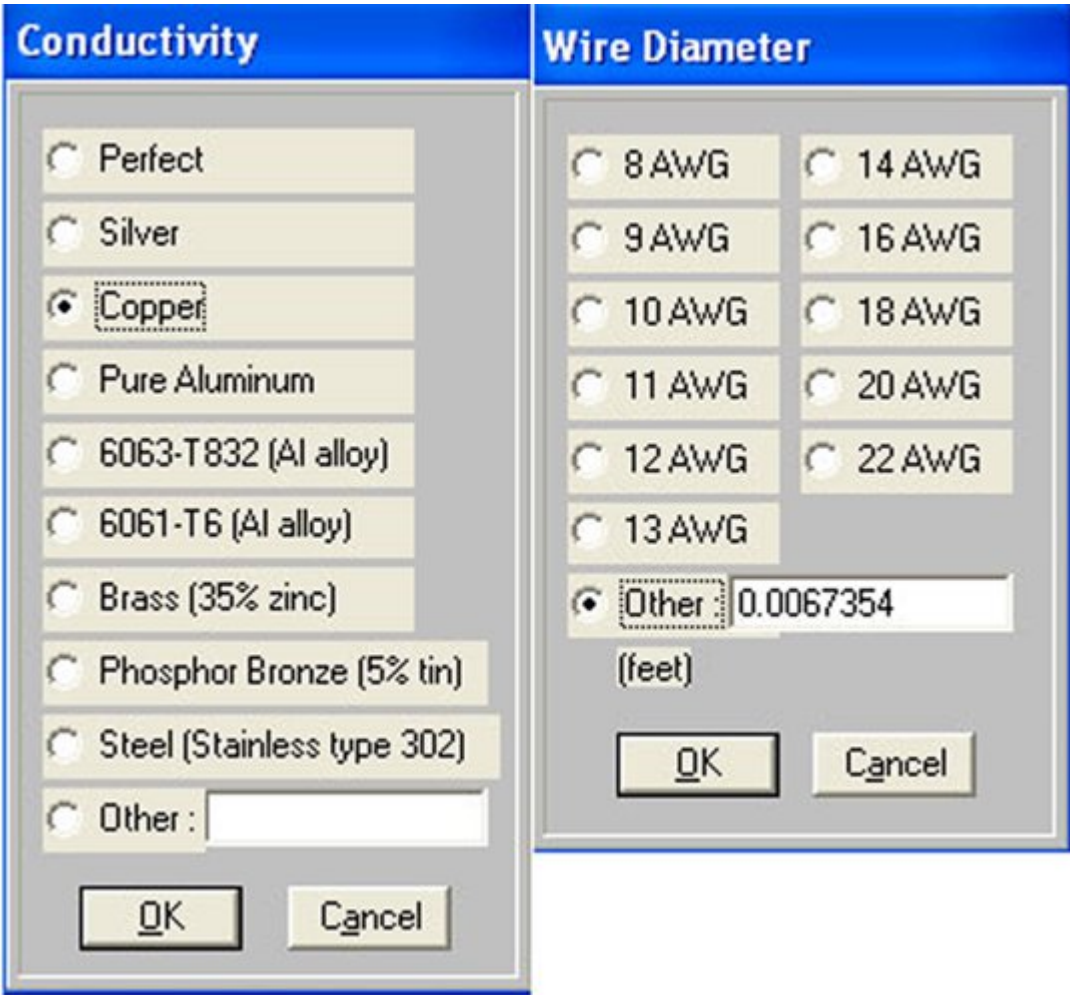
The NEC-Win Plus software window displays configuration parameters for a 10M 2-Element Beam. The Frequency is set to 28.5 MHz. The Ground is Sommerfeld Ground with a conductivity of 0.002 s/m and a relative permittivity of 10.0. The Radiation Patterns are defined by three elevation angles: 1° < Az < 359°, El = 14°, Step = 1°; 0° < El < 180°, Az = 270°, Step = 1°; and 0° < Az < 359°, El = 1°, Step = 1°. The Geometry is set to Stepped with a diameter of 50 Ohm. The table below shows the wire coordinates for the 2-element beam.

Wire	Seg.	X1	Y1	Z1	X2	Y2	Z2	Dia.	Conduct	Src/Ld
1	5	-106.2	0	240	-54	0	240	0.0313	6061	0/0
2	11	-54	0	240	54	0	240	0.0417	6061	0/0
3	5	54	0	240	106.2	0	240	0.0313	6061	0/0
4	5	-98.5	57.6	240	-54	57.6	240	0.0313	6061	0/0
5	11	-54	57.6	240	54	57.6	240	0.0417	6061	1/0
6	5	54	57.6	240	98.5	57.6	240	0.0313	6061	0/0

Fig 2 - NEC-Win Software Describing a 10M 2-Element Beam

In Figure 2, the first three rows of numbers describe the end-points used in the three pieces of tubing used for the reflector element. Rows 4-through-6 describe the end-points of the three tubes used to construct the driven-element.

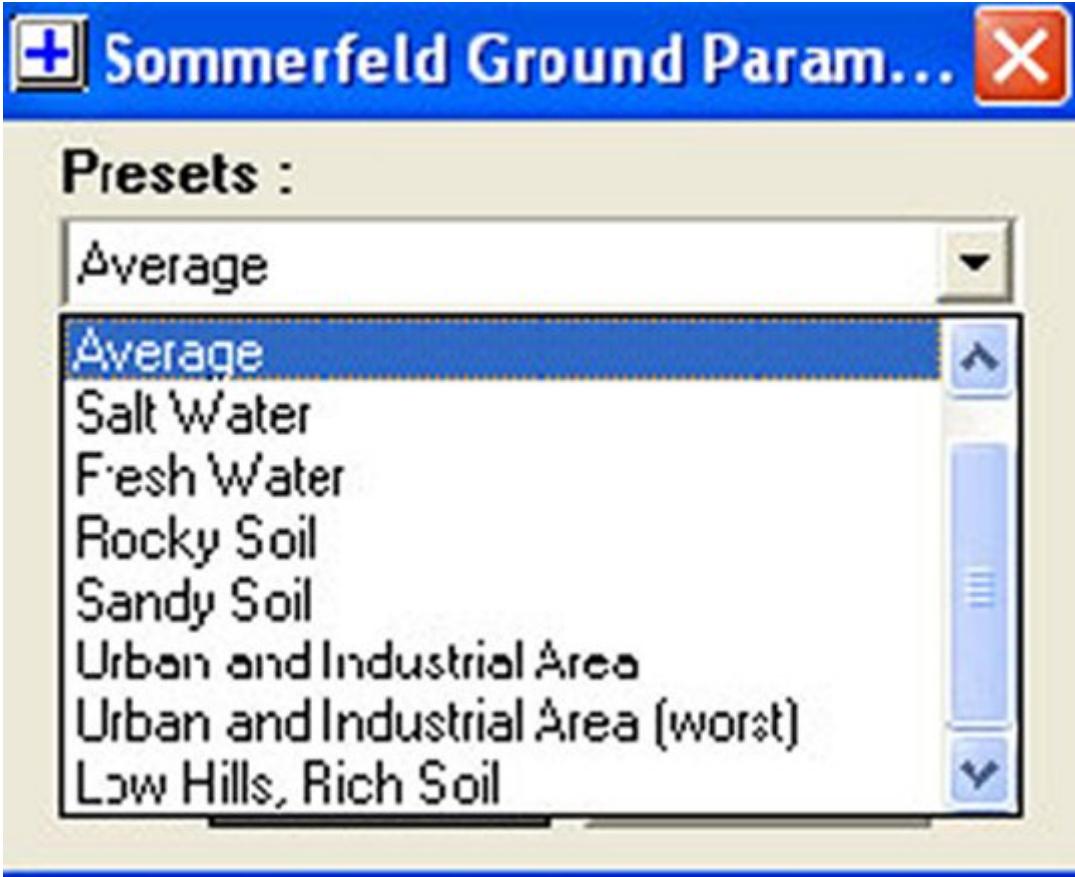
Fig03 below shows choices to select a material for "wires" and tubing.



**Figure 3 - The User Interface allows a choice of the material used and size**

### **Describing the Ground at your QTH**

Any good DX-er would be able to describe to you why the ground/soil conditions at the antenna site are very important to working DX. That is: usually low angles of antenna radiation will travel further on HF skip. That is why DX-pedition people smile when they say they used a vertical antenna on a saltwater beach. In order to simulate the effects that grounds have on "angle of radiation", Figure 4 shows that the software allows selecting the soil conditions that exist at your QTH or antenna site.



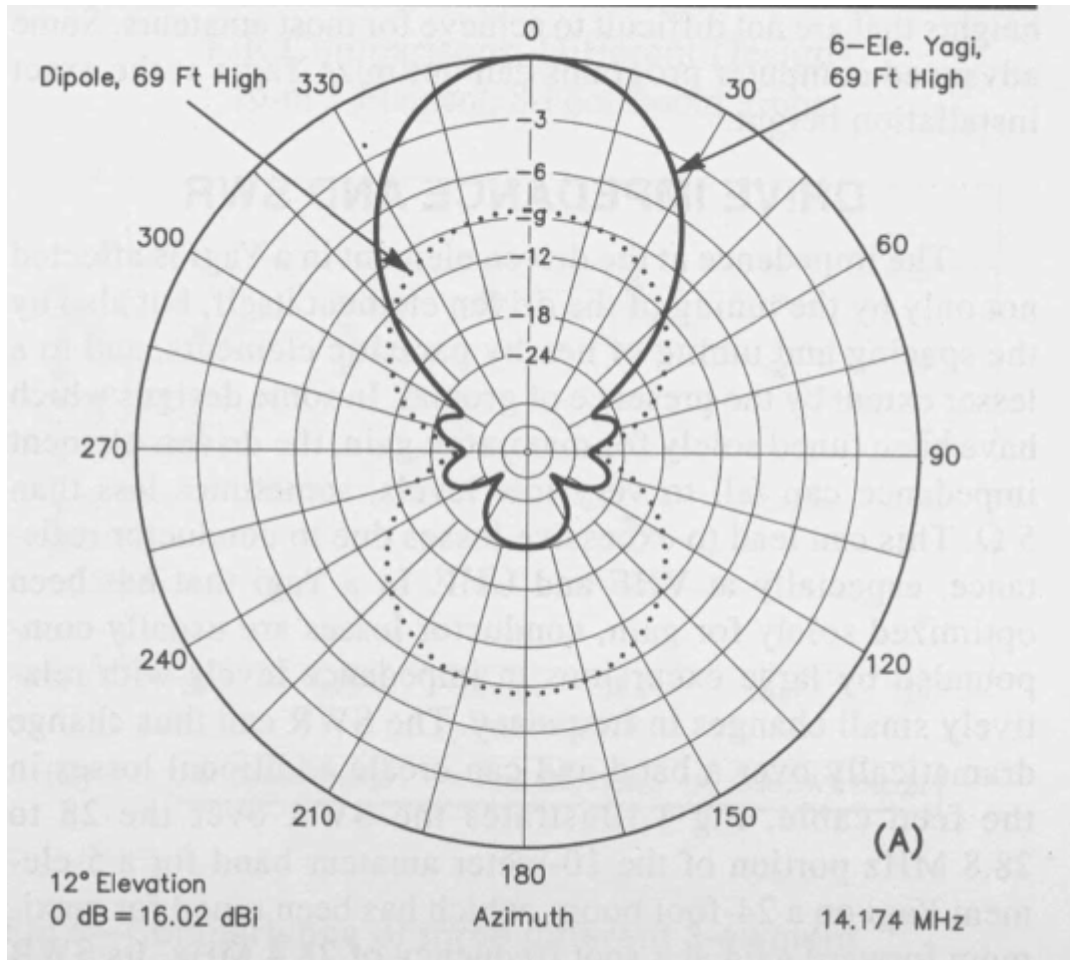
**Figure 4 - Choosing Soil Conditions for Simulation**



## Looking at Antenna Radiation Patterns

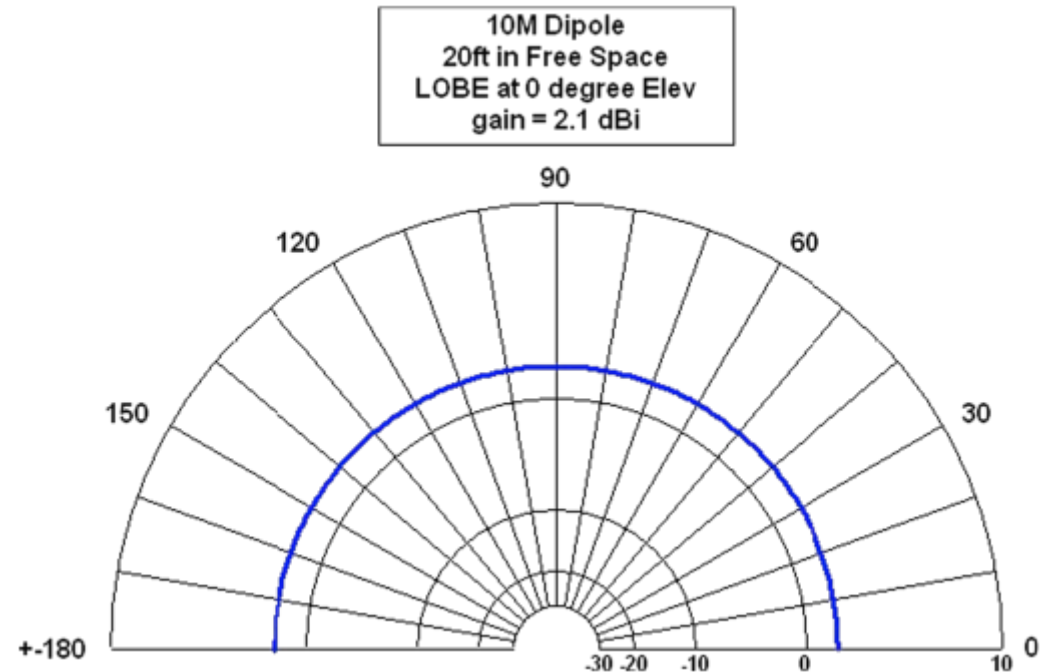
There are three aspects of antenna radiation patterns that are significant to analyze:

1. What is the elevation angle of radiation?
2. For beams, what is width of forward gain?
3. For beams, what is front-to-back ratio



**Figure 5 - Beam-width radiation of 6-element 20M Beam**

Physicists and Scientists always like to look at radiation patterns in free space. Free space is NOT of much interest to most hams, but free space does create a common denominator of antenna design. The important aspect of free space is that it does NOT distort the radiation patterns with reflections caused by the soil.



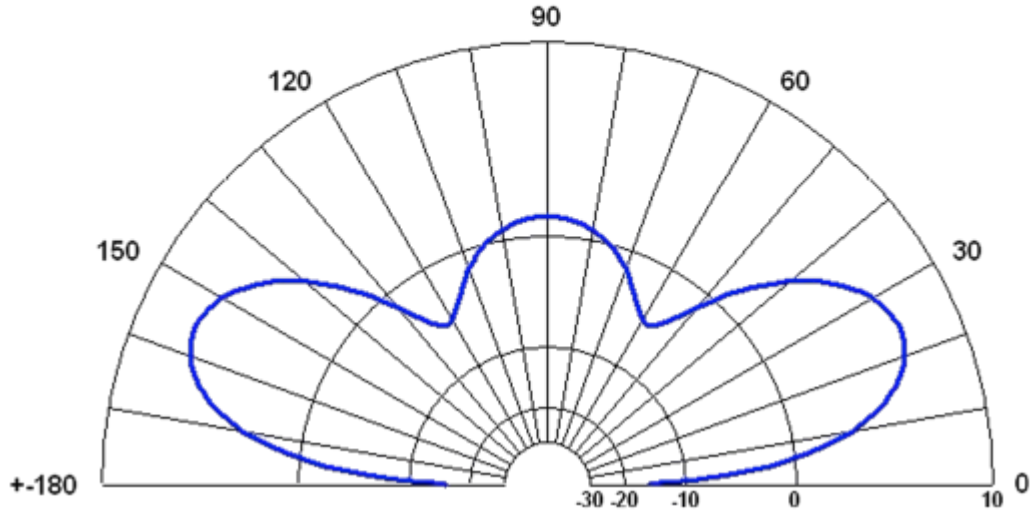
**Figure 6 - "free space" Elevation Pattern of 10M Dipole (looking down the wire)**

As you can see in Figure 6, the energy radiates symmetrically around the wire. Compare Figure 6 to Figure 7 where the ground/soil reflections distort the elevation radiation pattern.

The maximum power in Figure 7 is radiated at 24 degrees above the horizon when the 10M dipole is mounted at 20 ft. of height.

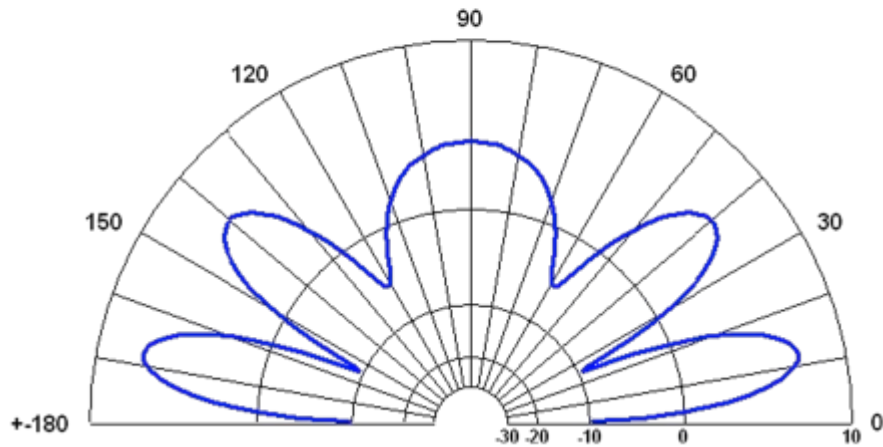
In this section of the article, the final elevation radiation pattern (as shown in Fig 9) is for a 10M 2-ele beam that is mounted only 16 feet high.

10M Dipole  
at 20ft over Sandy ground  
LOBE = 24 degree Elev  
gain = 7.5 dB



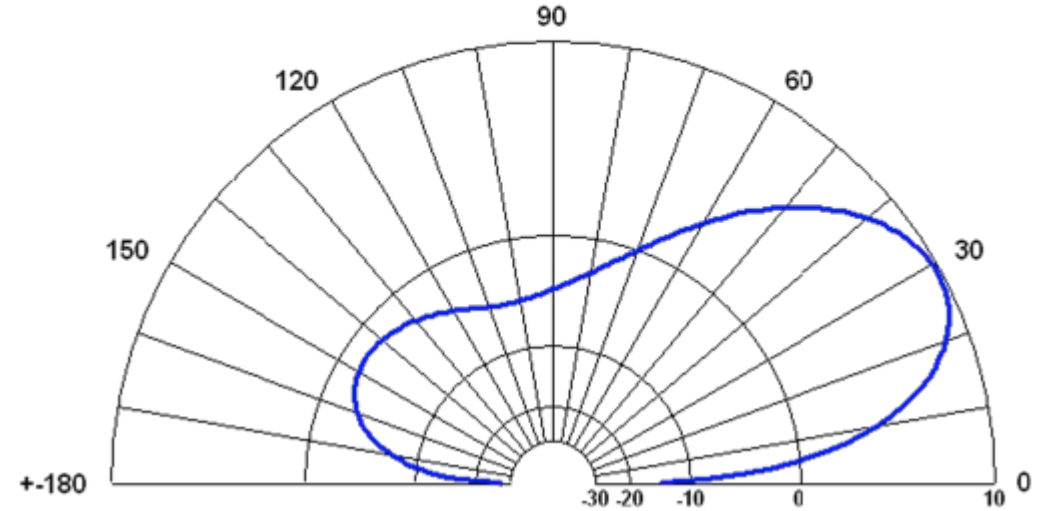
**Figure 7 - Elevation Radiation Pattern of 10M Dipole at 20FT over Sandy Soil (looking down the wire)**

10M Dipole  
at 40ft over Sandy ground  
LOBE = 12 degree Elev  
gain = 7.7 dB



**Figure 8 - Maximum Radiation of 10M Dipole at 40FT over Sandy Soil is 12 degrees above the Horizon**

2-EL 10M Beam  
at 16 ft over Sandy ground  
LOBE at 29 degree Elev  
gain = 9.8 dB



**Figure 9 - Maximum Radiation of 2-ele 10M Beam at only 16FT over Sandy Soil is 29 degrees above the Horizon**

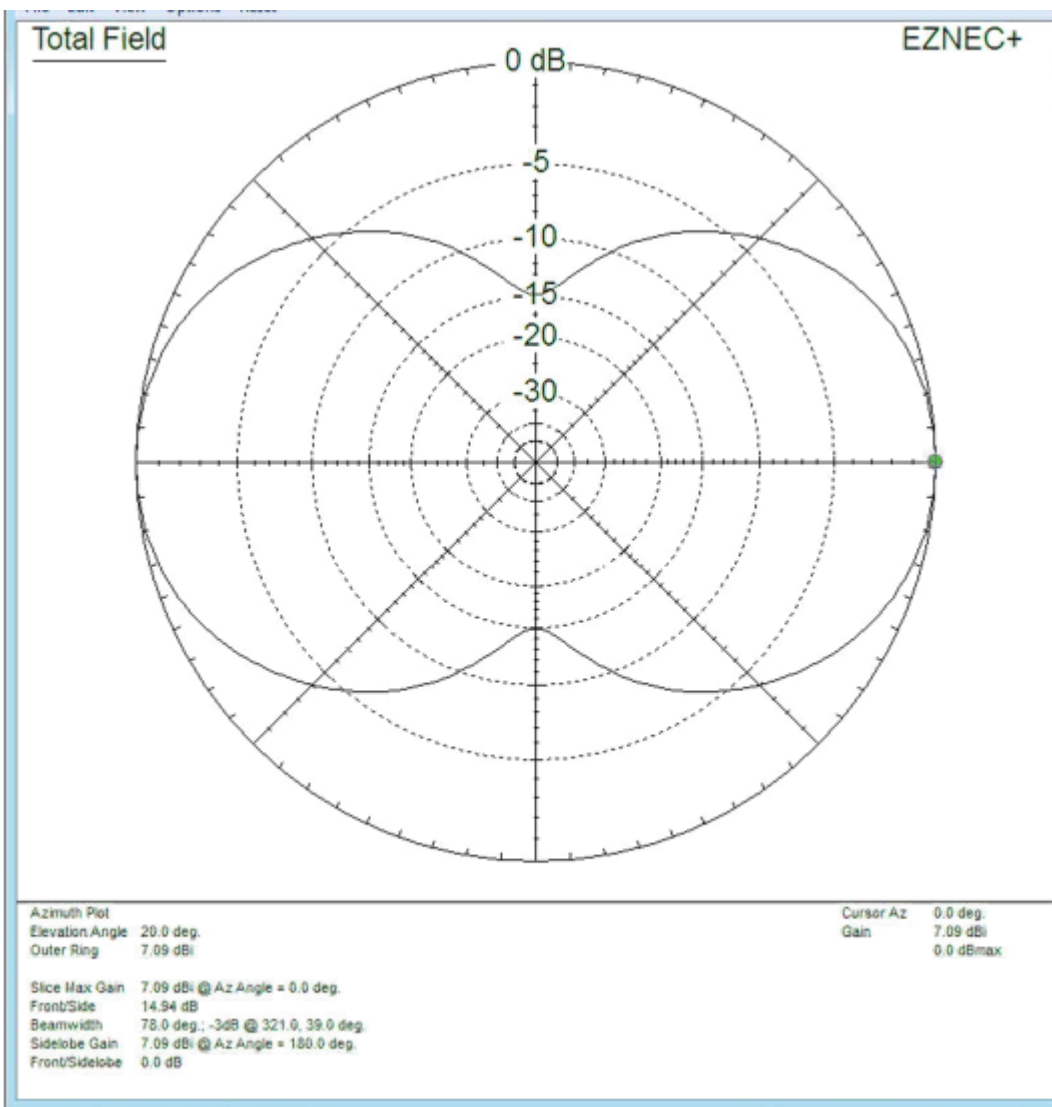
It can be clearly seen in Figure 9 that the beam has a created a reasonable front-to-back ratio of more than 10 dB.

The Antenna Modeling software will also display the azimuth radiation pattern of an antenna (that is: looking down from above the antenna).

Figure 10 illustrates that the radiation pattern of a typical dipole is strongest "broadside" and is fairly weak off the ends of the dipole.

As mentioned earlier in the article, Figure 6 illustrates the azimuth radiation pattern for a 6-element 20M beam that has terrific front-to-back ratio.

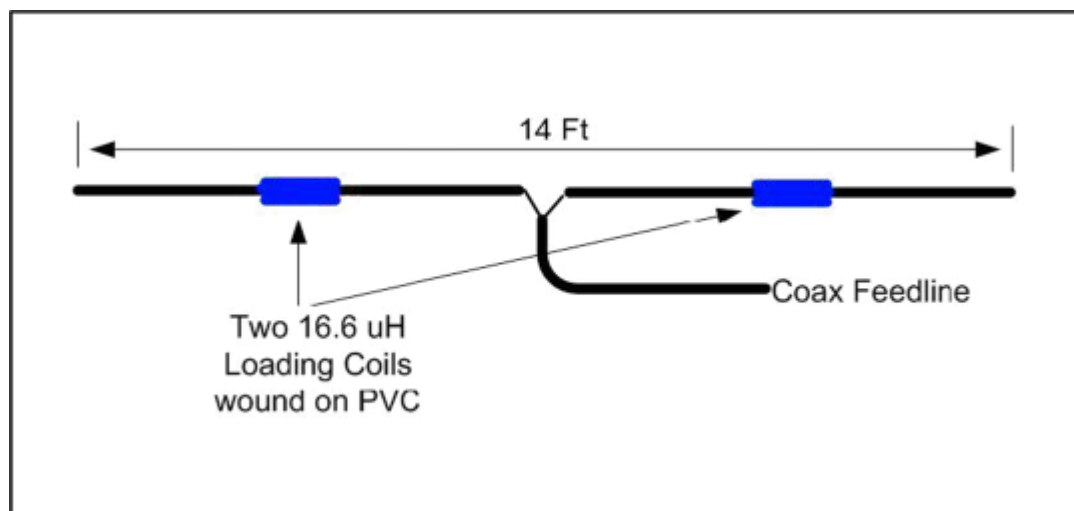




**Figure 10 - Azimuth Radiation pattern for typical 12M dipole(courtesy Bernard Huth W4BGH)**

## Designing a Shortened 30M Antenna

A normal 30M dipole is almost 45 feet long. I wanted something much smaller, so I set a goal for the length of about 14ft, literally 66% shorter in length. Fig11 shows the basic results my NEC-Win model program calculations.



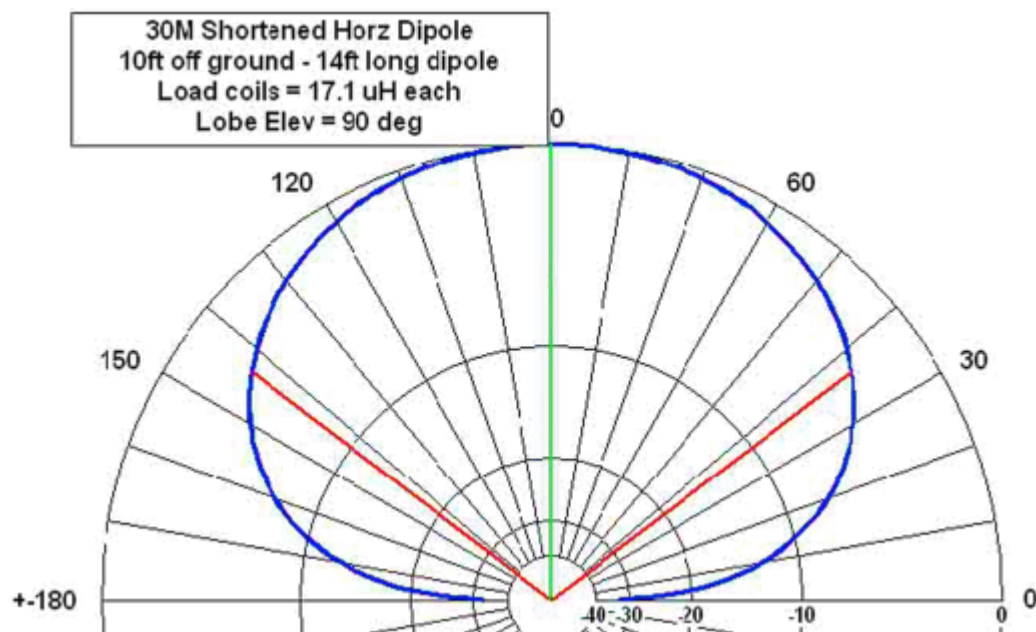
**Figure 11 - Concept of 14ft-long Shortened 30M Dipole using Four Pieces of Aluminum Tubing**

This concept in Figure 11 looks pretty simple. But, my first question is really, how well will it perform??? I don't want to go to a lot of effort on this project, so I made up my mind that I wanted to stick this up in the air on a 10 or 12 ft piece of wood (cheap tower). But, I recognized that 12 Ft elevation is not a lot of distance above ground for a 30M antenna. A good rule of thumb for a horizontal 30Meter antenna is  $\frac{1}{2}$  wavelength above ground and my plans are only 12 ft.

In Figure 12 let's look at the radiation angle of attack using a NEC-Win elevation output for this 30M horizontal antenna at 12 foot of height.

In Figure 12, the strongest radiation is STRAIGHT UP when a horizontal dipole is only 10 ft above ground. Most of the radiation energy is going straight up!!! But, I did not want a "cloud warmer" antenna!! There is NOT too much DX straight up in the air!!!

Even for local stations, very little radiation power from Figure 12 is pointed near the horizon.

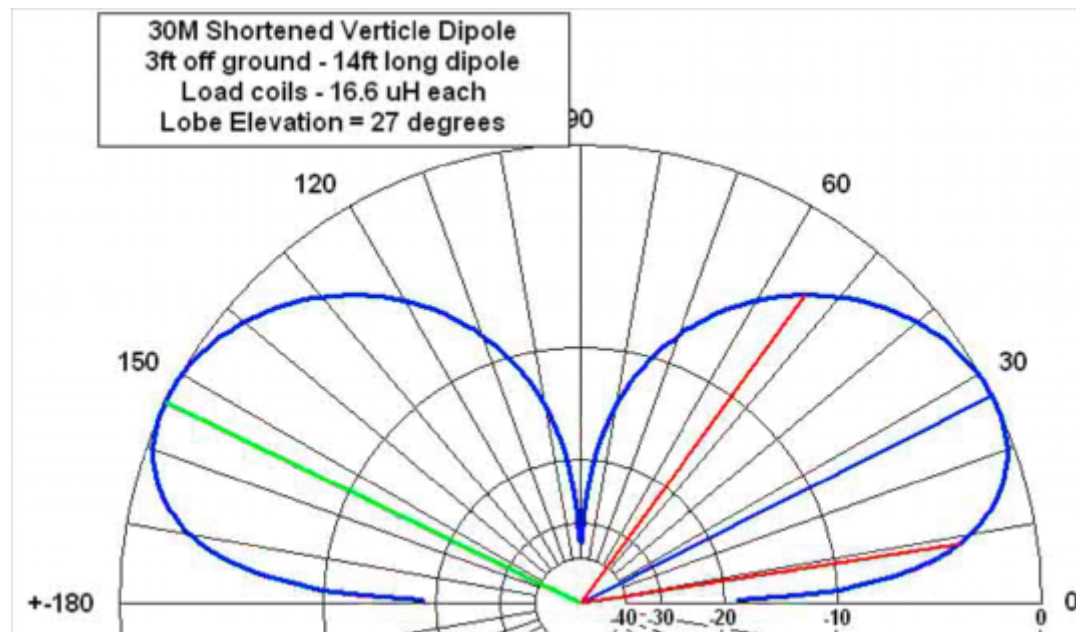


**Figure 12 - Elevation Plot of 30M Shortened Horizontal Dipole at 10 Ft above Ground**

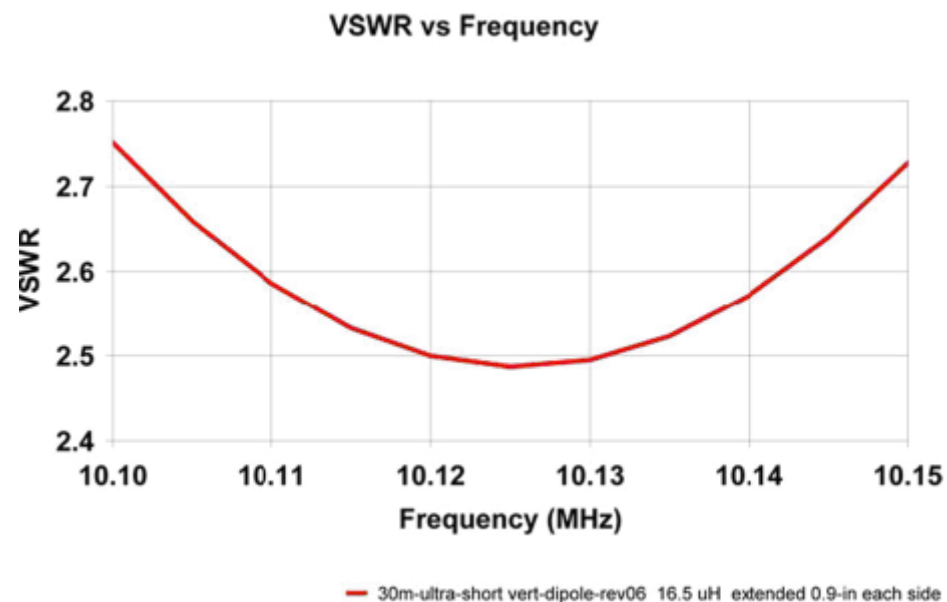
Well, I decided to use the modeling program to look at using a shortened vertical antenna instead. The solution for a better antenna could be rotating the dipole into a vertical orientation because vertical antennas do not have the same "above ground" radiation patterns as horizontal antennas. Now a classic 1/4-wave vertical requires "messy/awkward" radials. But, if I rotate the dipole to become vertical, the lower half of the dipole works exactly like a well laid out set of radials. So, there are no "messy" radials to worry about.

Figure 13 shows what the radiation elevation plot looks like for the 30M dipole that has been turned vertical. This is a much better radiation pattern than shown in Figure 12 using the same antenna!!!

The main radiation lobe is 27 degrees above the horizon. There is no radiation going "straight up" at 90 degrees.



**Fig 13 - Elevation Plot of 30M Shortened Vertical-Dipole with bottom at only 3 Ft off Ground.**



**Figure 14 - SWR Plot of shortened 30M Vertical-Dipole as predicted by the modelling software**



The SWR analysis prediction plot for the shortened 30M Vertical-Dipole using the modeling software is seen in Figure 14. This SWR plot came out extremely close to the results of the real antenna that I built. I only had to add about 2.0 inches of wire to each end to allow the SWR dip to be centered on the 30M band. (As a side-note, the loading coils narrow-down the SWR bandwidth of a shortened antenna. But in the case of the 30 Meter band, the ham frequency allocation in USA is very narrow (10.100-to-10.150 MHz), so the SWR results worked out very well.)



**Figure 15 -  
Finished  
Construction of  
shortened 30M  
Vertical-Dipole  
using 4-pcs of  
tubing**

## Looking at 1.2 GHz Panel Antenna

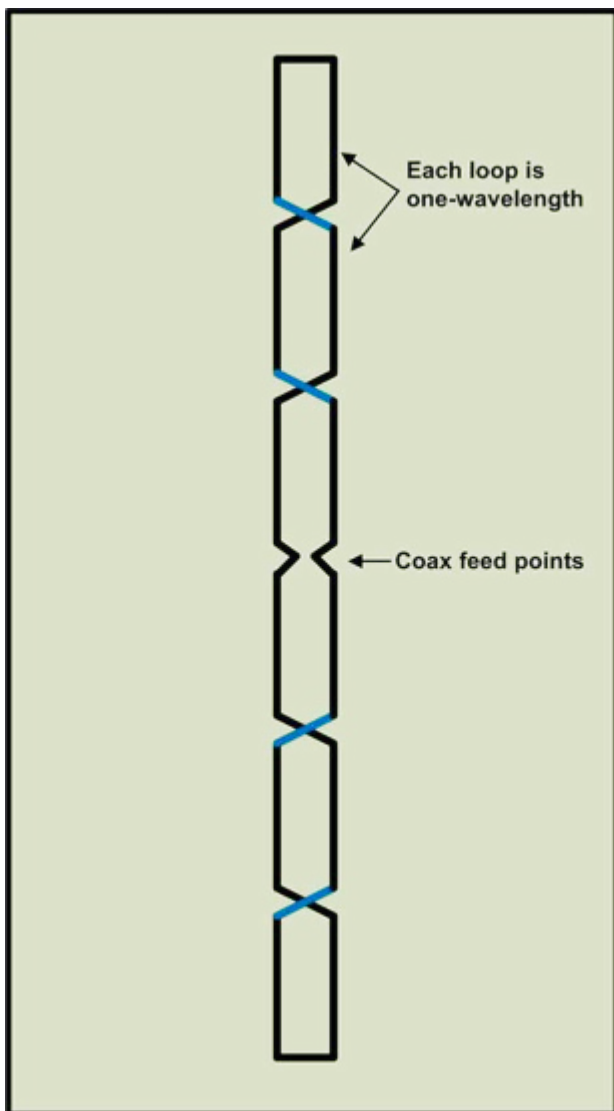
Back in 1997, John G8MNY published a short article in the BATC CQ-TV magazine that introduced the ATV readers to a panel antenna made with loops of heavy wire positioned above a reflector panel. John, G8MNY's article described using four loops of wire. A short time later, in 1998, Paul G8GML published his work in BATC CQ-TV magazine where he had over several years evolved the panel design to use six loops of wire for better gain and more convenient impedance.

I decided to model the panel antenna for 1.2 GHz in software as described in the G8GML article. Figure 16 shows the modern basic construction concept for the panel antenna. The design of Figure 16 can achieve a theoretical gain of about 14 dBd. Each loop is one-full wave-length (electrically) and can be thought of as two half-wave dipole antennas with 3 dBd of gain. Two loops double the number dipoles to provide 6 dBd of gain. Four loops provide 9 dBd. Six loops of wire can produce a gain of about 11 dBd. Finally, adding a metal reflector spaced behind the loop array will add another 3 dB and provide a total theoretical gain of 14 dBd!!

[NOTE - G8GML's earlier CQ-TV article stated field measured gain of 6 loops with the reflector at 16 dBd. Paul G8GML explained that performing field tests includes the ground's distortion of the radiation pattern and that the higher value of gain reported is the result of "ground gain", but is a good method to compare antennas at a specific location. "Your mileage may vary!"]

How About More Gain? - The beauty of this antenna is that you can double the number of arrays and easily use two sets of six-loops over a lightly larger reflector panel as shown in Figure 17.

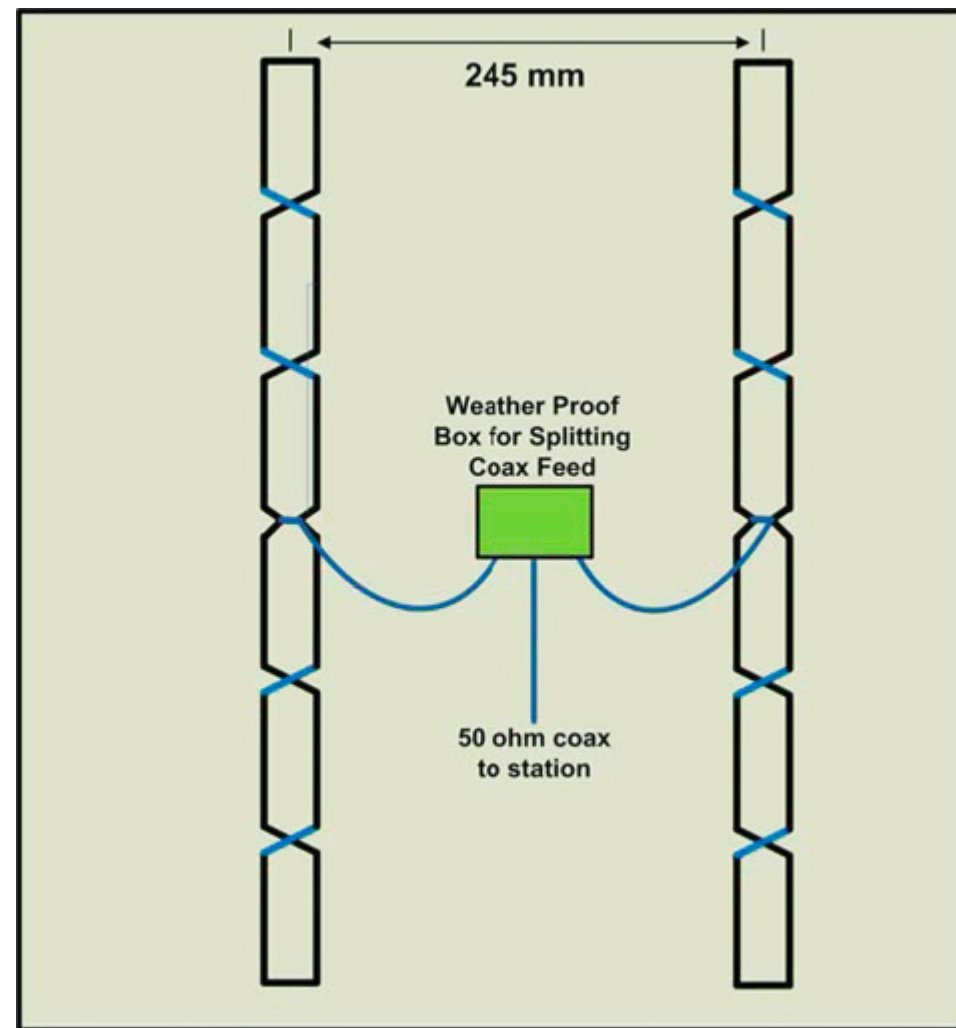
HA5IW has extended the gain even further by adding many more sets of six-loops as shown in Figure 18.



**Figure 16 - Six Loops of wire are positioned over a Mesh Reflector for basic Panel Antenna**

## Conclusion

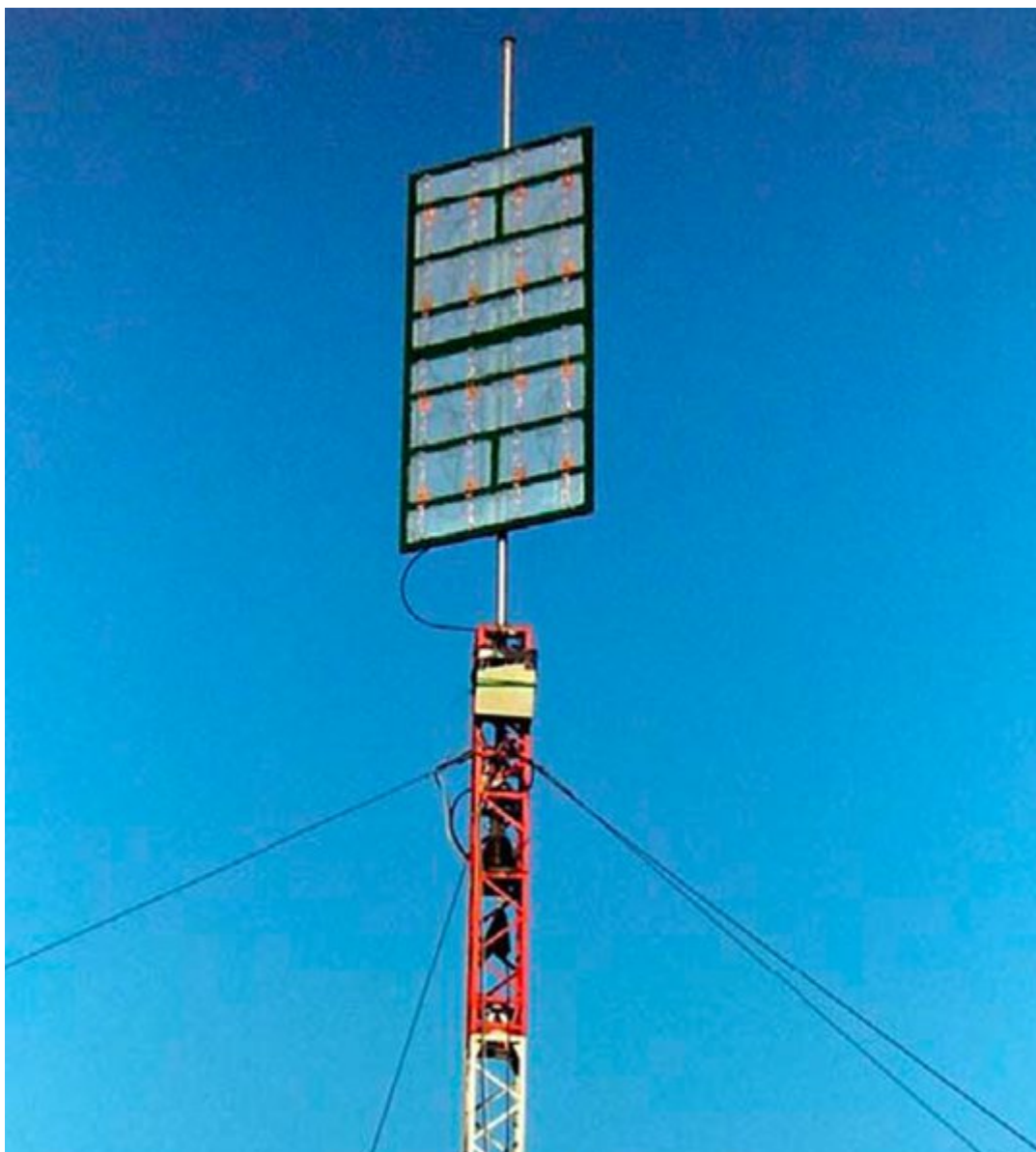
I have found that Antenna Modeling software like EZNEC can really help you design or improve antennas. But, you need to invest time to learn how to use the software program. At the time I got interested in antenna modeling, the ARRL offered an online class on Antenna Modeling, with weekly testing and a person assigned to answer questions from students.



**Figure 17 - Two sets of Six-Loop Arrays provide 3 dB more Gain for a Total of 17 dBd**

Unfortunately, the class is no longer offered by ARRL. I can only surmise that eventually the class was not economically feasible (that is: not enough students). One surprise about antennas that I learned from using modeling software was: the grounding system at the station/antenna does NOT affect performance for beam antennas (like angle of radiation or SWR). The station/beam-antenna grounding system is mainly for electrical safety.





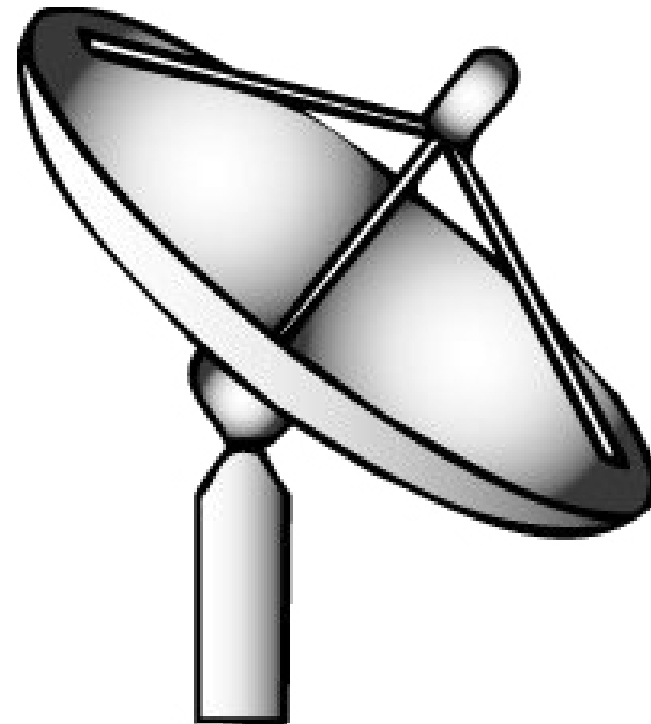
**Figure 18 - The Large 6-loop panel array by HA5IW mounted up on the Tower.(Courtesy of Paul G8GML)**

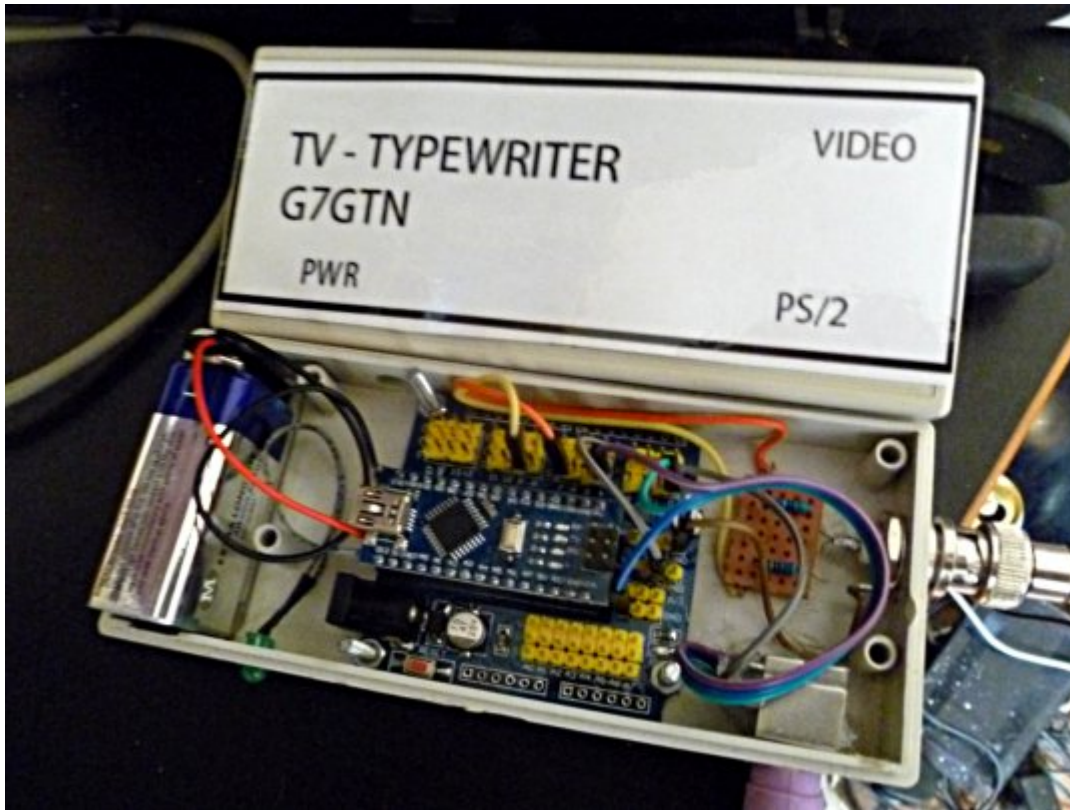
## Contact Info

The author may be contacted at [W6HHC@ARRL.net](mailto:W6HHC@ARRL.net)

## Other Modelling Software Information

- *NEC2* – was designed by Lawrence Livermore Labs
- *EZNEC* - uses NEC2 "core" software with Windows GUI - by Roy Lewallen, W7EL - [www.EZNEC.com](http://www.EZNEC.com)
- *NEC-Win* – uses NEC2 "core" SW with GUI - by L. B. Cebik, W4RNL (SK) - NO LONGER SOLD
- *MINI-NEC* – simplified NEC2 to run on slow PCs – fairly obsolete and inaccurate
- PowerPoint presentation file on Antenna Modeling Software by Ken W6HHC - see [www.W6ZE.org/Newsletter/ITEMS-of-INTEREST/ITEMS-of-INTEREST-index.html](http://www.W6ZE.org/Newsletter/ITEMS-of-INTEREST/ITEMS-of-INTEREST-index.html)

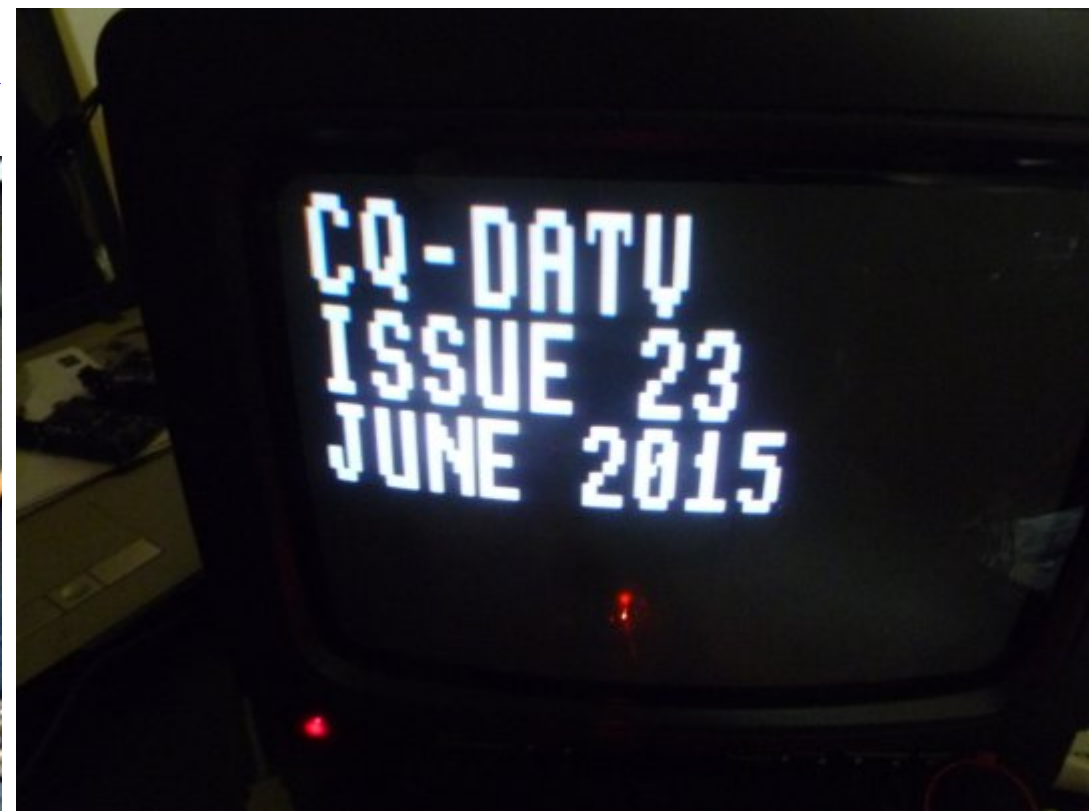




## Introduction

On screen caption generators are useful but often have the limitation that the captions need to be pre-generated and hence requires you to configure these elements within some software first before use. Sometimes it would be handy to be able to type a quick text message using large white characters on a black screen for transmission. Hence this very simple ATV Typewriter was born.

The immediate & obvious idea was to add a standard PS/2 computer keyboard to allow user input. This is compatible with both PAL & NTSC video signals; to function you simply



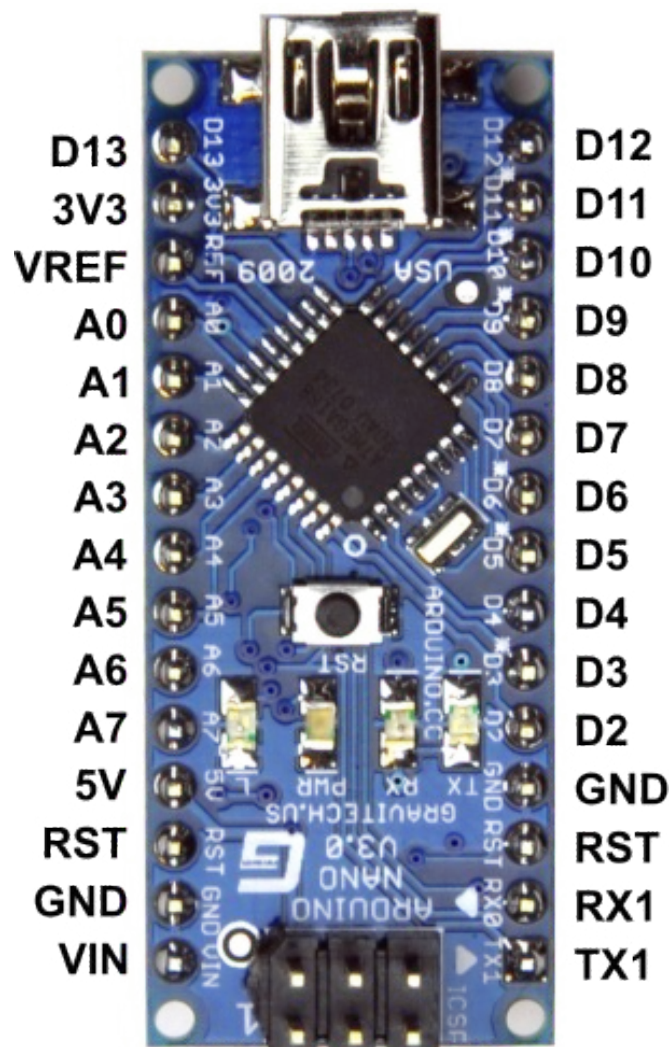
connect a standard PC keyboard (PS/2 type) and composite video output. You may have up to 14 characters over 6 lines for your text or captions.

## Circuit Connection Diagram

The project is based on an Arduino Nano module which contains an Atmel ATMEGA328P processor running at 16MHz clock speed.

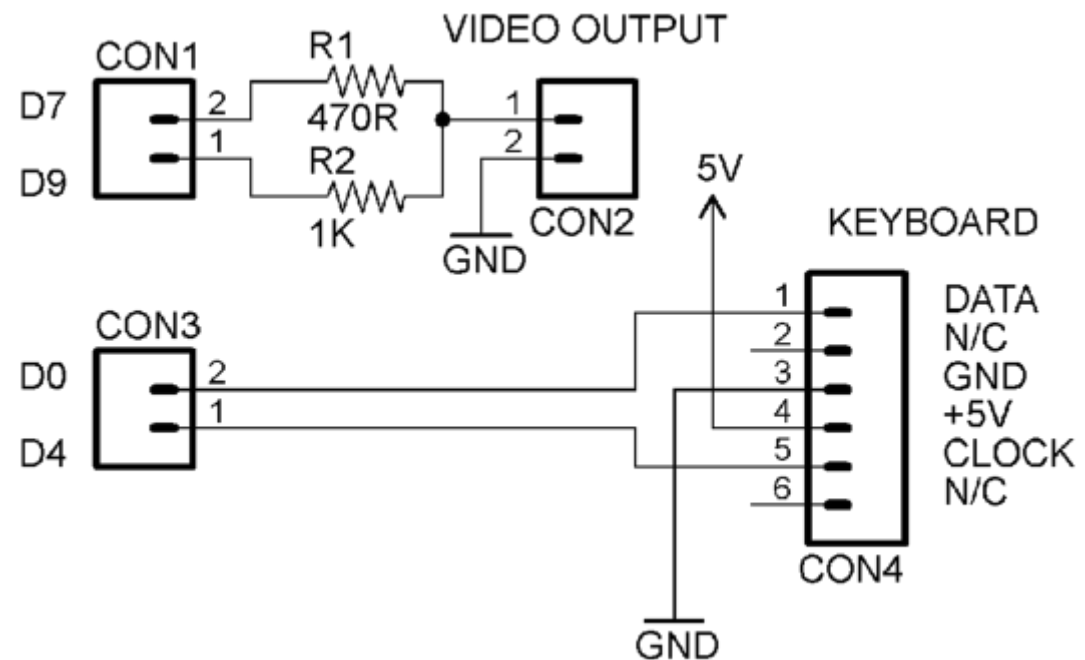
## Construction

To really make my construction as simple as possible I elected to make use of a ready built Arduino board. The one I selected is called the Nano and are generally available from various eBay suppliers for around £3 shipped.



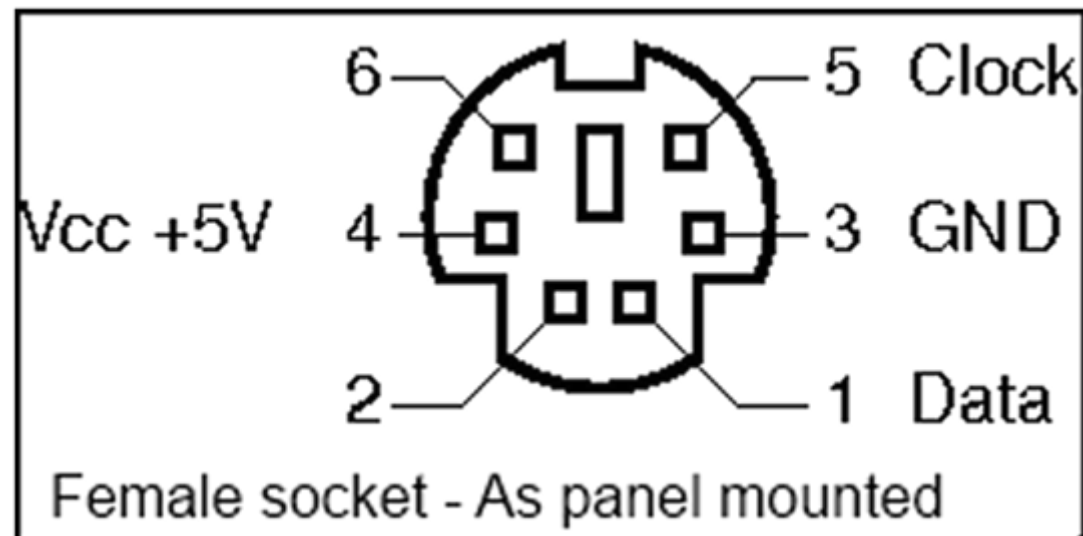
This has the USB chip CH340G on board for easy programming direct from the Arduino IDE. This module was plugged in to a pin header breakout module.

The two resistors that form the video DAC were mounted on a small section of stripboard and then soldered directly to the BNC video output socket. Using this construction method meant not also having to build a small +5V power supply section.

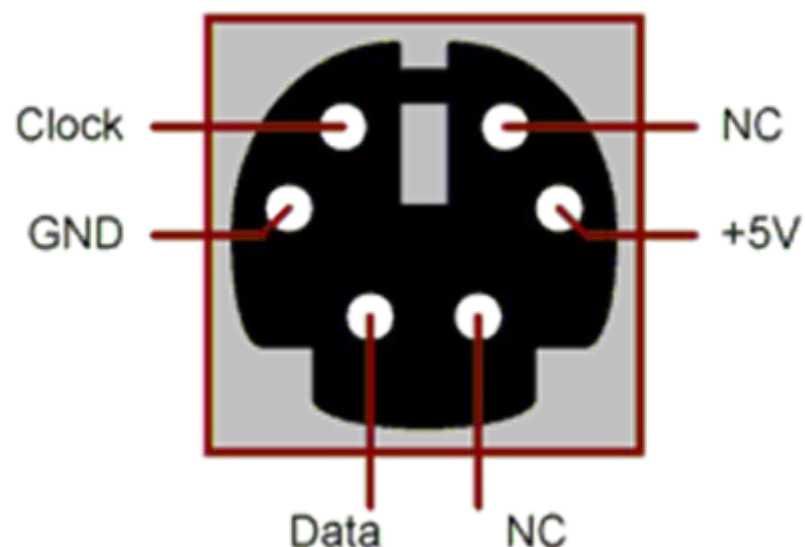


The PS/2 keyboard requires 4 connections to be made, these being the Data & Clock lines and a +5V and Ground power supply connection.

The pin out of the PS/2 socket and male keyboard plug when viewed facing you is







**(Keyboard Cable Male Connector)**

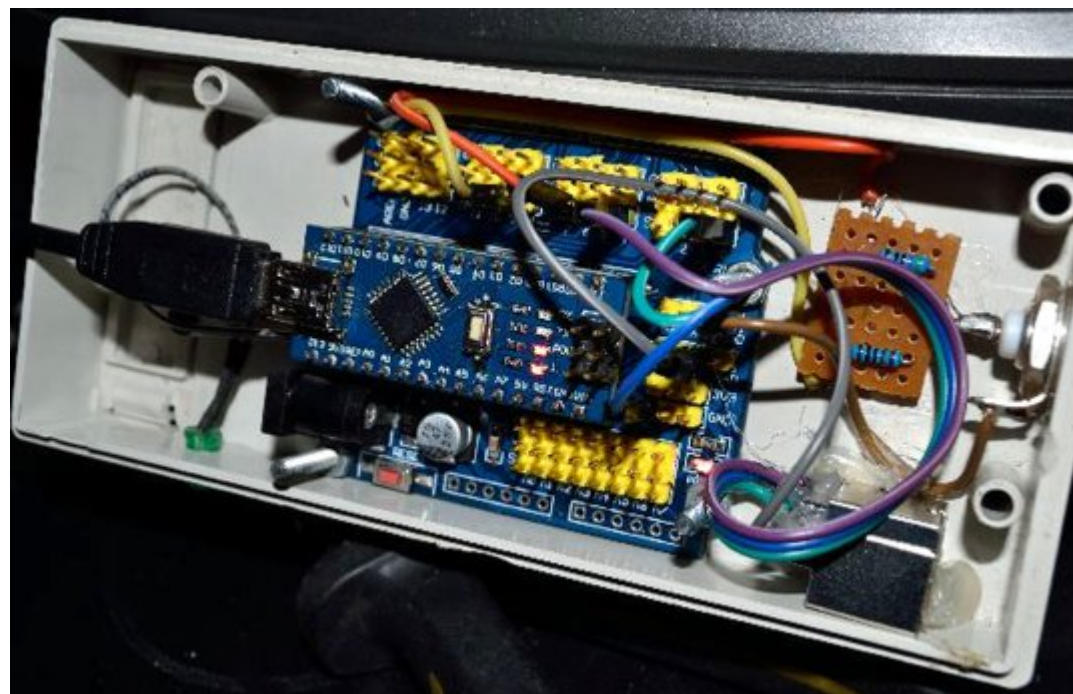
My prototype unit was housed in a small plastic box measuring approx 140mm X 55 which allowed plenty of space for a PP3 battery and any required future additions.

## Firmware

The firmware along with the two required libraries TVOUT & PS/2 are included in the project ZIP file and available from the usual CQ-DATV download location. Once you have installed the additional libraries in to your Arduino folder just upload the PS2TYPE.INO file to your module from the IDE.

## Operation

With your standard PS/2 PC keyboard connected just enter the text you require. ESC will clear the whole screen and



**(Prototype Module Holder Board Detail)**

finally the Home key will set the text position to (0,0) which is top left .

To enter uppercase letters you need to depress and hold the SHIFT key at the same time as entering your text. The function keys from F2 - F12 could be allocated with fixed captions in code by you. At present each function key just prints its own name on screen.

We end up with a simple, but still quite functional unit that you can easily extend with some quite modest Arduino programming efforts of your own.



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Images should be in PNG format if possible and the best quality available. Do not resize or compress images, we will do all the rework necessary to publish them.

If you are sending a construction project, please include the dimensions of any pcb's and make the pcb image black and white, not greyscale.

CQ-DATV reserves the right to redraw any schematics and pcb layouts to meet our standards.



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